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SCROPHULARIACEÆ OF THE SOUTHEASTERN UNITED STATES

BY FRANCIS W. PENNELL.

The present revision of the species of the Scrophulariaceæ occurring in the southeastern portion of the United States, from North Carolina to Florida and westward to the Mississippi River, is the outgrowth of a long-continued and especial interest. Nearly fifteen years ago, when the writer was a student in the Botanical Section of The Academy of Natural Sciences of Philadelphia, certain problems in this field appeared, and have waited for the solutions now proposed. Perhaps this early connection will make more fitting the appearance of this paper in these PROCEEDINGS.

During the late summers and early autumns of 1912 and 1913, I collected extensively through every state of this area. This was in pursuit of a monographic study of the genera now called *Macranthera*, *Dasistoma*, *Afzelia*, *Aureolaria*, *Agalinis* and *Otophylla*. Nearly every species was found, and descriptions made of the form and color of the corolla of each. Later, almost every herbarium of significance for these species has been reviewed, and the results are presented with some confidence. A preliminary paper, dealing with the species of the Coastal Plain, was published in the "Torrey Bulletin" in 1913, and a summary of this group for North America is now awaiting publication in the Contributions from the Botanical Laboratory of the University of Pennsylvania.

In the course of these two trips many collections were made of the nearly related *Buchnera*, and, less consistently, attention was given to other genera of the family. But, to obtain field-descriptions and to collect for the first time the spring-flowering species, another trip was necessary. In the Spring of 1917 I traveled as far south as Key West, and from the Coast into the Appalachians. The expedition was peculiarly successful, so that now, excepting for a few local species of the lowland, as *Herpestis rotundifolia* and several of *Agalinis*, or of the upland, as *Ilysanthes saxicola* and *Penstemon smallii*, or of the mountains in late summer, as *Chelone lyoni*, practically every species has been described from flowering plants.

Excluding *Agalinis* and its allies, specimens preserved in eastern herbaria only have been reviewed. I have studied all in the her-

baria of The New York Botanical Garden, the Brooklyn Botanic Garden, The Academy of Natural Sciences of Philadelphia, the University of Pennsylvania, the United States National Museum, (including the former Biltmore Herbarium), and the Charleston Museum. In all institutions I have received the kindest attention and assistance.

The present revision follows a plan which should lead to a simple and helpful presentation of our taxonomic knowledge of this family within the area considered. Keys are given throughout, and these are made so ample as to include all features of evident contrast noted. Effort is made to group species and genera according to real relationship, hence giving the keys a phylogenetic value. To accomplish this, and to show what appears to have been the evolutionary progress within this family, a rearrangement of the whole has been made. This was first attempted in my "Scrophulariaceæ of the Local Flora,"¹ but the placing of the Gratiolæ as introductory to the genuine Scrophulariaceæ now appears to me more satisfactory. While of theoretic suggestiveness, it is hoped that these keys may prove of practical service.

Synonymy is given, so far as to explain the origin and application of each specific and varietal name used, and to account for every such name ever proposed from within this area. The original statement as to the type or to typic distribution is quoted, and consequent discussion is given. Practically all typic or isotypic² material known to occur in this country has been verified, and in *Agalinis* and allies much of that abroad. Especially rich in types are the herbaria of The Academy of Natural Sciences of Philadelphia, where Nuttall's and de Schweinitz's plants are preserved, and of the Charleston Museum, containing Elliott's collection.

The statements of distribution, variability, season of flowering and of fruiting, corolla-color, and other comment scarcely need explanation. For *Agalinis* and allies, which I have collected repeatedly and over a wide range, my forthcoming monograph will give a more detailed analysis of the range of each species. At present for all species I am stating range in general terms, and shall trust to receive corrections from workers who find this treatment partial or erroneous. The detailed noting of corolla-color will be of interest to students in the field. In every case, unless otherwise stated,

¹ Torrey 19: 109-114. 1919.

² The word "isotype" is used to designate a specimen of the original collection, other than the type itself. See Torrey 19: 13. 1919.

this has been recorded from notes made with fresh flowers before me.

A last insertion may require more justification. This is of the collection-numbers of the specimens made by me, grouping these by states. While not attempting to list collections, because of space-limitation, it does seem advisable to present this series, showing specimens considered authentic. For *Agalinis* and allies my forthcoming monograph will state fully the herbaria in which each may be consulted; for these and for the other genera, the numbers between 4,000 and 6,000 may be seen in the herbarium of the University of Pennsylvania at Philadelphia and numbers between 9,000 and 10,000 in that of the New York Botanical Garden. Duplicates are in many collections.

Corolla with the posterior lobes external in the bud.

(ANTIRRHINOIDEÆ.)

Tree. Leaves cordate, 15–20 cm. long. Inflorescence a panicle. Sepals leathery, clothed with stellate hairs. Corolla 50–60 mm. long. Capsule 40 mm. long, with broadly winged overlapping seeds.

I. PAULOWNIÆ.

Herbs. Leaves smaller. Sepals membranous (with stellate hairs only in *Verbascum*.) Corolla smaller. Capsule smaller, and seeds not overlapping.

Capsule septicial or loculicidal by a simple median slit, the septum rupturing or deciduous. Corolla not spurred.

Corolla not saccate anteriorly, not horned.

Stigma two-lipped. Leaves usually more or less glandular-punctate. Pedicels frequently bibracteolate.

II. GRATIOLEÆ.

Stigma capitate. Leaves not glandular-punctate. Pedicels not bracted (or with a varying number of bractlets in *Chelone*).

Filaments five. Capsule without placental hairs. Leaves opposite, ternate or alternate, with blades much wider than the stem.

Corolla rotate, slightly zygomorphic, its lobes much longer than the tube. Filaments all with fertile anthers. Leaves alternate.

III. VERBASCEÆ.

Corolla tubular-campanulate, zygomorphic, its lobes shorter than the tube. Posterior filament without anther, the others didynamous. Leaves opposite or ternate.

IV. CHELONEÆ.

Filaments four. Capsule filled with tortuous hairs, between which are the scattered seeds. Leaves in fours, sixes or eights, with rudimentary blade which is narrower than the stem.

V. RUSSELIÆ.

Corolla saccate anteriorly, and with a fine horn at the base of the anterior lobes. Leaves opposite.

VI. ANGELONIEÆ.

Capsule loculicidal, the septum and adjacent capsule-wall persisting, the remaining wall splitting irregularly. Corolla with a spur at the base of the anterior petal. Leaves alternate.

VII. ANTIRRHINEÆ.

Corolla with the anterior lobes external in the bud. Herbs.

(RHINANTHOIDEÆ.)

Stamens two, the postero-laterals present, the antero-laterals completely lost. Antero-lateral lobes of corolla external in bud. Not parasitic. Sepals four, the posterior lost. Posterior lobes of corolla completely united.

VIII. VERONICEÆ.

Stamens four, didynamous, the antero-laterals usually slightly the longer. Usually, perhaps always, parasitic on the roots of other plants.

Sepals five, alike, more or less united. Corolla-lobes all somewhat distinct, the two posterior spreading or broadly arched; anterior lobe external in the bud.

IX. BUCHNEREÆ.

Posterior sepal shorter or wanting. Corolla decidedly two-lipped, the posterior lobes united and arched nearly to apex, the anterior lobes usually shorter; anterior or one antero-lateral lobe external in the bud.

X. RHINANTHEÆ.

I. PAULOWNIEÆ

1. *Paulownia*.

II. GRATIOLEÆ.

Leaves alternate. Stamens five. Corolla essentially regular. Pedicel not bibracteolate.

2. *Capraria*.

Leaves opposite. Stamens four or two (the posterior stamen lost). Corolla more or less zygomorphic.

Leaves entire to serrate. Seeds brown or yellow.

Seeds reticulate. Corolla with the ridges to the antero-lateral sinuses low and not projecting beyond those points (so anterior filaments simple). Posterior lobes of the corolla little, if at all, shorter than the anterior.

Leaves uniform. Capsule longer than wide, acute or obtuse, its dehiscence septicial, or septicial plus loculicidal.

Sepals all alike. Pedicels never bibracteolate. Stamens four. First splitting of capsule loculicidal.

Corolla white, rotate, 3-5 mm. long, densely hirsute within over bases of all lobes; lobes longer than tube, the two posterior united throughout. Sepals four, distinct. Lips of stigma united, but line of union stigmatic. Placentæ fused with septum. Upper leaves alternate.

3. *Scoparia*.

Corolla lavender, personate, 20–35 mm. long, pubescent within below bases of the anterior lobes; lobes shorter than tube, the two posterior united about three-fourths length. Sepals five, united over one-half length. Lips of stigma distinct. Placentæ wide, peltate in cross-section, attached by a narrow line to the septum. Leaves all opposite.

4. *Mimulus*.

Sepals unequal, all distinct. Pedicels frequently bibracteolate. First splitting of capsule septicidal. Pedicels bibracteolate at base. Stamens four. Corolla pubescent within at base of posterior lobes.

5. *Mecardonia*.

Pedicels bibracteolate at apex or not at all.

Erect. Outer sepal not more than twice the width of the innermost. Corolla 8–20 mm. long, with tube much longer than the lobes. Pedicels bibracteolate. Postero-lateral stamens fertile, the antero-laterals rudimentary or wanting.

Corolla-tube broad, within densely pubescent on the posterior side. Sepals of nearly uniform length. Plants relatively lax or succulent, the leaves and sepals plane.

6. *Gratiola*.

Corolla-tube very narrow, within uniformly short-pubescent on all sides. Sepals very unequal in length. Plant stiff, the leaves and sepals revolute.

7. *Sophranthe*.

Extensively repent. Outer sepal over twice the width of the innermost. Corolla 3–11 mm. long, with tube little longer than the lobes.

Stamens four. Corolla 7–11 mm. long. Outer sepal not deeply cordate nor conspicuously reticulate.

Corolla glabrous within, the throat yellow, the lobes white; posterior lobes distinct. No hypogynous bristles. Outer sepal oval or ovate, scarcely exceeding the oblong or lanceolate innermost. Capsule over one-half as broad as long. Leaves widening distally, very entire. Pedicels reflexed in fruit. Plants inodorous.

Stem pubescent. Leaves spatulate-oval to nearly orbicular, with seven to nine longitudinal nerves. Pedicel not bibracteolate. Sepals obtuse, scarcely longer than the rounded capsule. Styles distinct at apex.

8. *Ranapalus*.

Stem glabrous. Leaves spatulate-oblong, with one evident longitudinal nerve. Pedicel bibracteolate. Sepals acute or acutish, much exceeding the acute capsule. Styles united to apex, and stigmas short, semi-capitate.

9. *Bramia*.

Corolla pubescent within over bases of all lobes, blue throughout; posterior lobes united to apex. A circle of bristles surrounding the base of the ovary. Outer sepal slightly cordate, evidently exceeding the linear-attenuate innermost. Capsule less than one-half as broad as long. Leaves clasping, broadest proximally, crenate. Pedicels bibracteolate, spreading in fruit. Stem pubescent. Plant lemon-scented.

10. *Hydrotrida*.

Stamens two, the antero-laterals lost. Corolla 3 mm. long, white. Outer sepal deeply cordate and conspicuously reticulate. Stem finely pubescent. Pedicels not bibracteolate.

11. *Herpestis*.

Leaves dimorphic; several lanceolate ones borne on the abbreviated basal portion of the stems, and a pair of oval ones at the apex of the slender distal portion. Capsule wider than long, deeply notched, with rounded flattened lobes, only dehiscent loculicidally.

12. *Amphianthus*.

Seeds with fine transverse lines. Corolla with two raised ridges (each formed by the adherence of the filament) to the antero-lateral sinuses, and which project as knob-like processes beyond this point (the free portion of the filament appearing as a lateral outgrowth of the adherent portion). Posterior lobes of the corolla less than two-thirds the length of the anterior.

Corolla violet-blue, 6-11 mm. long, the posterior lobes $\frac{1}{3}$ - $\frac{2}{3}$ length of the anterior. Postero-lateral stamens perfect, antero-lateral filaments without anthers. Style with an enlarged callose base. Sepals five, united at base. Capsule two-celled, oval in outline, 2-5 mm. long. Ascending or repent.

13. *Ilysanthes*.

Corolla pale-lavender or white, 1.5-2 mm. long. Postero-lateral stamens lost, antero-lateral filaments with anthers. Style filamentous to base. Sepals four, the posterior lost. Capsule one-celled at maturity (by loss of septum and shortening of the placentæ), globose, 1 mm. long. Repent.

Sepals united only at base. Corolla with posterior lobes evident, united one-half length of anterior. Styles distinct less than one-fourth length. Leaves orbicular. 14. *Globifera*.

Sepals united $\frac{1}{2}$ – $\frac{2}{3}$ length, split nearly to base on the anterior side. Corolla with the posterior lobes lost, the tube split nearly to base on posterior side. Styles distinct $\frac{1}{3}$ – $\frac{1}{2}$ length. Leaves elliptic-obovate. 15. *Hemianthus*.

Leaves bipinnatifid. Seeds pale greenish-yellow, ridged, with faint transverse lines. Pedicel not bibracteolate. Corolla lavender. Erect. 16. *Leucospora*.

III. VERBASCEÆ

17. *Verbascum*.

IV. CHELONEÆ

Seeds angled or winged, maturing many to each cell. Corolla-lobes uniformly colored, shorter than the tube which is not conspicuously pouched at base posteriorly. Posterior filament a conspicuous process. Sepals nearly or quite distinct. Plants stiff, 4–20 dm. tall.

Corolla white or pink-red, pubescent or glabrous within, its anterior lobes projecting. Sepals distinct. Sterile filament slender, filiform, white.

Corolla membranous, somewhat pubescent or glabrous within over base of anterior lobes. Sterile filament as long as the others, pubescent on its posterior face. Anther-sacs distinct, glabrous or barbate with short hairs. Sepals lanceolate to ovate, acute to acuminate. Seeds wingless. Inflorescence compound, a raceme of cymosely branching lax flower-clusters.

18. *Penstemon*.

Corolla semi-fleshy, densely pubescent within over base of anterior lobes. Sterile filament much shorter than the others, glabrous. Anther-sacs becoming confluent, densely lanate. Sepals ovate-orbicular, rounded. Seeds winged. Inflorescence simple, a spike-like raceme of single flowers on short several-bracted pedicels.

19. *Chelone*.

Corolla red-brown, glabrous within, its antero-lateral lobes vertically projecting, the anterior lobe deflexed. Sepals obviously united at base. Sterile filament shorter than wide, two-lobed, red-brown. Inflorescence compound.

20. *Scrophularia*.

Seeds rounded, smooth, maturing one to each cell. Anterior corolla-lobes blue, posterior white, all longer than the tube which is strongly pouched at base posteriorly. Posterior filament a crescentic scarcely raised process. Sepals united over one-third length, enclosing over half the capsule. Plant lax, 1–3 dm. tall.

21. *Collinsia*.

V. RUSSELIEÆ

22. *Russelia*.

VI. ANGELONIEÆ.

23. *Angelonia*.

VII. ANTIRRHINEÆ.

Plants glabrous. Flowering stems erect. Leaves linear, only the uppermost small ones with axillary flowers. Pedicels not over 10 mm. long.

24. *Linaria*.

Plants hirsute. Flowering stems prostrate. Leaves ovate to orbicular, nearly all with axillary flowers. Pedicels over 10 mm. long.

25. *Kickxia*.

VIII. VERONICEÆ.

Leaves whorled. Corolla white, its lobes shorter than the tube. Capsule acute, longer than broad, not flattened. Plant 10-20 dm. tall.

26. *Veronicastrum*.

Leaves opposite or alternate. Corolla blue or white, its lobes longer than the tube. Capsule acute to deeply notched, broader than long, flattened. Plants lower.

27. *Veronica*.

IX. BUCHNEREÆ.

Corolla not blue, with open orifice. Stamens all with anthers two-celled, lanate. Filaments and style nearly as long as or longer than the tube of the corolla. Capsule exerted from the calyx-tube. Pedicels not bracted.

Corolla tubular, orange, with thickened base, fleshy, semi-persistent, shriveling and blackening before falling. Filaments equal, long-exserted, pubescent with beaded hairs. Anther-sacs closely parallel, 6-7 mm. long. Pedicels deflexed in fruit.

28. *Macranthera*.

Corolla with inflated throat and spreading lobes, yellow or pink, membranous, soon falling. Filaments not long-exserted, pubescence not beaded. Anther-sacs less than 5 mm. long. Pedicels erect or permanently spreading.

Anther-sacs glabrous or with a few bristle-like hairs at apex. Stigma short, punctiform or capitate. Filaments dilated-flattened and pubescent. Corolla yellow.

Corolla densely pubescent within on all sides, its lobes all distinct and slightly shorter than the tube. Filaments clearly didynamous, dilated and pubescent throughout. Anther-sacs each opening by a slit its entire length. Style short, thick, more or less bilobed, persistent and reflexed on the capsule. Pedicels 1-2 mm. long. Plant stout, 15-20 dm. tall, the leaves 10-30 cm. long.

29. *Dasistoma*.

Corolla slightly pubescent within (in a ring about the base of the filaments and below posterior sinus), its lobes longer than the tube, the two posterior united nearly one-half their length. Filaments nearly equal, dilated and pubescent at base. Anther-sacs each opening by a slit one-sixth to one-fourth its length. Style long, slender, entire, deciduous,

straight. Pedicels 4–10 mm. long. Plants slender, 2–10 dm. tall, the leaves 1–3 cm. long.

30. *Afzelia*.

Anther-sacs lanate on the valvular surface. Stigma linear, consisting of a line down each side of the linguiform style-apex. Filaments slender, not dilated, more or less lanate.

Corolla yellow. Capsule acute to acuminate. Leaves lanceolate to ovate, entire to bipinnatifid, petioled. Stem stout, over 4 dm. tall.

31. *Aureolaria*.

Corolla pink, with red spots within on the anterior side. Capsule rounded, with a mucro. Leaves filiform to lanceolate, entire or auriculate-lobed at base, sessile. Stem usually slender.

Stem ascending-scabrous to glabrous. Leaves linear to filiform, entire. Pedicels over 1 mm. long. Calyx-lobes linear to subulate, slightly longer to much shorter than the tube. Anther-sacs of both pairs of stamens uniform: Capsule globose to globose-ovoid, 3–7 mm. long. Seeds closely reticulate.

32. *Agalinis*.

Stem retrorse-hispid. Leaves lanceolate, usually auriculate-lobed at base. Pedicels less than 1 mm. long. Calyx-lobes ovate, longer than the tube. Anther-sacs of posterior stamens shorter. Capsule broadly ovate in outline, 10–13 mm. long. Seeds reticulate with raised ridges.

33. *Otophylla*.

Corolla purple-blue or white, salverform, the tube very narrow and densely pilose within, the lobes widely spreading. Stamens each with but one anther-sac developed. Filaments and style less than one-half length of corolla-tube. Capsule mostly or quite enclosed within calyx-tube. Pedicels bibracteolate.

34. *Buchnera*.

X. RHINANTHÆ.

Posterior sepal shorter than the others. Pedicels bibracteolate at apex. Capsule turgid, septicial, only tardily slightly loculicidally dehiscent. Seeds linear, flat, 2 mm. long.

35. *Schwalbea*.

Posterior sepal wanting. Pedicels not bracted. Capsule flattened, loculicidal, splitting through septum. Seeds turgid. Corolla with posterior lobes projecting, not hooded at apex, the anterior lobes very short, thickened, deep-green. Capsule cylindrical, equally two-celled, in dehiscence splitting on both posterior and anterior sides. Seeds many, reticulate. Bracts foliaceous, distally scarlet.

36. *Castilleja*.

Corolla with posterior lobes arched, hooded at apex, the anterior lobes membranous, flat, colored. Capsule ensi-

- form, unequally two-celled, splitting only on the posterior side. Seeds few, not reticulate. Bracts not colored.
- Corolla yellow or pink throughout, the anterior lip not raised into a palate. Anthers glabrous. Seeds maturing more than four to a capsule. Sepals of each side united nearly or quite to apex. Leaves bipinnatifid-lobed. 37. *Pedicularis*.
- Corolla white, the anterior lip raised into a yellow densely pubescent palate. Anthers pubescent. Seeds maturing two to four to a capsule. Sepals united at base only, the two postero-laterals longer. Leaves lanceolate, entire or setaceous-toothed near base. 38. *Melampyrum*.

1. **PAULOWNIA** Siebold and Zuccarini.

Paulownia Sieb. and Zucc., Fl. Jap. 1: 25. pl. 10. 1835. Type species, *P. imperialis* S. & Z., of Japan.

1. ***Paulownia tomentosa*** (Thunb.) Baill.

Of Japan. Is occasionally found, along roads, railways, etc. A frequently cultivated tree.

2. **CAPRARIA** Linné.

Capraria L., Sp. Pl. 628: 1753.

Type species, *C. biflora* L.

1. ***Capraria biflora*** L.

Capraria biflora L., l. c. 628. 1753. "Habitat in Curassao." Specimens from Curaçao seen in Herb. New York Botanical Garden.

Sandy soil, mostly along the beach, somewhat in waste ground and on edges of hammocks inland, subtropical Florida. A widespread species of lowland Tropical America. Very variable; varies with us mainly in size and proportions of leaf, and in the length of the hairs on the stem and pedicels, such hairs in the plant considered to be typical are entirely wanting. The pubescent state may be called forma *hirta* Loes., in Bull. Herb. Boiss., ser. II, 3: 284. 1903. ("Habitat in Guatemala, in dept. Chiquimula in ruderalibus ad S. Juan Ermita—Sel[er] n. 3314." Isotype seen in herbarium New York Botanical Garden.)

Flowering and fruiting probably throughout the year, although all specimens seen were collected between November and June. Corolla white or violet-tinged and slightly spotted with violet within throat. Normally the five stamens are fertile, but any, and as many as four, may become rudimentary. Examination of fresh flowers shows that both in *Capraria* and *Scoparia* the posterior lobes of the corolla are external in the bud, thus confirming the

impression gained from distribution and the nature of the glands in the leaves of the latter, that these genera belong to the *Gratioleae*. Pennell (Florida)—9559, 9598, 9610, 9633.

3. *SCOPARIA* Linné.

Scoparia L., Sp. Pl. 116. 1753.

Type species, *S. dulcis* L.

1. *Scoparia dulcis* L.

Scoparia dulcis L., l. c. 116. 1753. "Habitat in Jamaica, Curassao . . . Hort. Cliff. 320." ex L., Hort. Cliff. 320. 1737. "Crescit in Curassao & Jamaica." No specimens from Curaçao seen, but the plant here considered unquestionably occurs there.

Gratiola micrantha Nutt., Amer. Jour. Sci. 5: 287. 1822. "Collected in East Florida, during October and November, 1821, by A. Ware, Esq." Type, collected by Nathaniel A. Ware, seen in Herb. Academy of Natural Sciences of Philadelphia.

Scoparia grandiflora Nash, Bull. Torr. Bot. Club 23: 105. 1896. "Collected in the flatwoods at Tampa [Florida], where it was quite frequent. [G. V. Nash] No. 2417." Type seen in Herb. Columbia University at the New York Botanical Garden. I have collected this at Tampa, my number 9643. *Scoparia dulcis* varies considerably in size of corolla, but no other character correlates with this, nor do larger-flowered plants occur in an environment distinct ecologically or geographically. Wide gradation in corolla-size may be found within one colony.

Waste places, cultivated ground, especially in sandy soil, southern Georgia to southeastern Texas and southward; wholly within the Coastal Plain. A wide-spread weed of lowland Tropical America.

Flowering and fruiting in subtropical Florida throughout the year, northward flowering in summer (from about May to September), and soon ripening fruit. Corolla white, at times the lobes slightly pinkish.

Pennell (Florida)—9643, 9656, 9678, 9702. (Louisiana)—4254.

4. *MIMULUS* Linné.

Mimulus L., Sp. Pl. 634. 1753.

Type species, *M. ringens* L.

Leaf-blades ovate, petioled. Angles of stem slightly winged. Pedicels stout, in fruit 5–10 mm. long. Calyx-lobes setaceous-tipped, 1–2 mm. long. Corolla 35 mm. long. Seeds pale-yellow. 1. *M. alatus*.

Leaf-blades lanceolate, not petioled. Angles of stem not winged. Pedicels slender, in fruit 30–60 mm. long. Calyx-lobes lanceolate, 3–5 mm. long. Corolla 20–30 mm. long. Seeds brownish yellow.

Cauline leaves with the blades narrowed at the base, not clasping. Corolla 20–25 mm. long. 2. *M. minthodes*.

Cauline leaves with the blades broader and clasping at the base. Corolla 25–30 mm. long. 3. *M. ringens*.

1. *Mimulus alatus* Ait.

Mimulus alatus Ait., Hort. Kew. 2: 361. 1789. "Nat. of North America. Introd. 1783, by Mr. William Malcolm."

Wet woods and shaded river-bottoms, loam soil, throughout the area above the Fall line, but not extending into the higher Appalachians; and along river-bottoms in the Coastal Plain. Ranges from Connecticut to Ontario and Kansas, south to northern Florida (along the Apalachicola River), Mississippi and Oklahoma.

Flowering from late July to late August, probably ripening fruit in September and October. Corolla lavender pink, within throat essentially as in *M. ringens* but the spots are smaller and the coloring fainter.

2. *Mimulus minthodes* Greene.

Mimulus minthodes Greene. Leaflets Bot. Obs. & Crit. 2: 1. 1909. "The type specimens are in U. S. Herb. and were collected at Birmingham, Ala., Aug., 1888." Type seen in United States National Herbarium.

Meadows, northern Georgia and northern Alabama; Piedmont region.

Not seen growing. Possibly not distinct from *M. ringens*.

3. *Mimulus ringens* L.

Mimulus ringens L., Sp. Pl. 634. 1753. "Habitat in Virginia, Canada . . . Hort. ups. 176. t. 2." In the Hortus Upsalensis 176, pl. 1, 1748, Linné described and figured our plant.

Swales and along streams in woodland, in loam, through the area above the fall line, reaching at least to 4400 feet altitude in the southern Appalachians, mostly more common northward; apparently not descending into the Coastal Plain. Ranges from Nova Scotia to Minnesota, south to upper South Carolina, northern Florida³ and Kansas.

Flowering from mid July to late August, fruiting in September and October. Corolla lavender, paler externally, within on anterior side two ridges which distally bear purple-red spots and proximally two yellow areas mottled with faint brownish patches.

5. *MECARDONIA* Ruiz and Pavon.

Mecardonia R. and P., Syst. Veg. Fl. Per. et Chil. 164. 1798.

Type species, *M. ovata* Ruiz & Pavon, of Peru.

Corolla white, its posterior lobes united $\frac{1}{2}$ - $\frac{2}{3}$ their length. Outer sepals lanceolate, rarely more than twice width of inner. Leaf-blades prevailingly lanceolate, conspicuously cuneate at base. Erect or somewhat diffuse.

³ Reported from Quincy, Florida, by A. W. Chapman in West. Jour. Med. & Surg. 3: 473. 1845.

Leaf-blades mostly oblanceolate, long-cuneate at base. Pedicels mostly over 15 mm. long. Corolla-lobes less widely spreading.

Main stem-leaves 3–4.5 cm. long. Outer sepals 6–8 mm. long. Corolla about 10 mm. long. Plant branched above, usually 3–4 dm. tall, erect or nearly so.

1. *M. acuminata*.

Main stem-leaves 1.3–2 cm. long. Outer sepals 5–6 mm. long. Corolla 7–8 mm. long. Plant much branched from the base, 1–2 dm. tall, diffusely spreading and ascending.

1a. *M. acuminata peninsularis*.

Leaf-blades ovate, more shortly cuneate at base, 1–1.7 cm. long. Pedicels mostly 8–12 mm. long. Corolla 7–8 mm. long, its lobes relatively widely spreading. Plant apparently laxly ascending.

1b. *M. acuminata brevifolia*.

Corolla yellow, its posterior lobes united nearly to apex. Outer sepals ovate, more than four times width of inner. Leaf-blades often ovate, more shortly cuneate at base. Procumbent or ascending.

Corolla lemon-yellow, 6 mm. long, glandular-puberulent within. Outer sepals broadly ovate. Pedicels 1–2 times the length of the ovate bracts.

2. *M. procumbens*.

Corolla deep lemon-yellow, 7–8 mm. long, short-pubescent within. Outer sepals ovate. Pedicels several times the length of the lanceolate-ovate bracts.

3. *M. tenuis*.

1. ***Mecardonia acuminata*** (Walt.) Small.

Gratiola acuminata Walt., Fl. Carol. 61. 1788. Type not verified, but description evidently of plant here considered. Doubtless from lower South Carolina where this plant is common.

Gerardia cuneifolia Pursh, Fl. Amer. Sept. 422. 1814. "In Georgia. Bartram. v. s. in Herb. Banks." Type not verified. Description appears to be of our plant, but the statement is made that the leaves are alternate above while in *acuminata* they are opposite throughout.

Matourea nigrescens Benth., Comp. Bot. Mag. 1: 173. 1836. "(*Gratiola acuminata* Ell.; non Pursh.)" ex Ell., Sketch Bot. S. C. & Ga. 1: 15. 1816. "Grows in ditches and wet places, extensively diffused." Elliott interpreted correctly the species of Walter, but Pursh had confused with this *Gratiola virginiana* L.

Mecardonia acuminata (Walt.) Small, Fl. S. E. Un. St. 1065, 1337. 1903.

Moist sandy loam, or heavier loam soil, usually near streams, in pineland or deciduous woodland, frequent or common in most portions of the Coastal Plain (although absent from such an area as the Altamaha Grit of southern Georgia), extending to Cape Canaveral in southern Florida although through the Everglade Keys mostly replaced by var. *peninsularis*; and also reaching the mountain valleys of western North Carolina and northern Georgia. Ranges from Maryland to Florida and eastern Texas, extending inland to western Kentucky, southern Missouri and eastern Oklahoma.

Flowering from May to September, and soon ripening fruit. Corolla white, within with longitudinal pink veins on the posterior side.

Pennell (Georgia)—4088. (Florida)—9658. (Louisiana)—4283.

1a. *Mecardonia acuminata peninsularis* Pennell, var. nov.

Plants much branched from the base, diffusely spreading and ascending. Main stem-leaves oblanceolate, long-cuneate at base, 1.3–2 cm. long. Outer sepals 5–6 mm. long. Corolla 7–8 mm. long.

Type, in hammocks and pine-lands, Black Point, below Cutler, Florida, collected in fruit and late flower, November 13, 1903, J. K. Small & J. J. Carter 824, in Herb. New York Botanical Garden; isotype in Herb. Academy of Natural Sciences of Philadelphia.

Moist places, pine-land, hammocks and everglades, southern Florida.

Pennell (Florida)—9542.

1b. *Mecardonia acuminata brevifolia* Pennell, var. nov.

Plants apparently laxly ascending, slightly branched, 1–4 dm. tall. Main stem-leaves ovate, cuneate at base, 1–1.7 cm. long. Outer sepals 5–6 mm. long. Corolla 7–8 mm. long.

Type, Gulfport, Mississippi, collected in flower September 8, 1900, F. E. Lloyd & S. M. Tracy 94; in Herb. New York Botanical Garden.

Moist places in longleaf pine-land, southern Georgia and northern Florida to southern Texas.

2. *Mecardonia procumbens* (Mill.) Small.

Erinus procumbens Mill., Gard. Dict. ed. VIII. n. 6. 1768. “. . . .
Houst. MSS.” Type not known to exist, but description appears to be of the plant here considered. Houston collected in tropical America.

Mecardonia procumbens (Mill.) Small, Fl. S. E. Un. St. 1065, 1338. 1903.

Moist soil, loam or sand, meadows and edges of hammocks, subtropical Florida.⁴ A wide-spread weed of lowland Tropical America, perhaps introduced into our flora.

Flowering and fruiting probably throughout the year. Corolla externally greenish-yellow, within on the lobes lemon-yellow, and with more or less evident longitudinal dark veins on the posterior side.

Pennell (Florida)—9549.

⁴ Reported as “*Monniera chamaedryoides peduncularis*” by Mohr, Contrib. Nat. Herb. 6: 721. 1901, as occurring in Alabama from “Upper Division Coast Pine belt to Coast Plain.” Surely confused with a form of *Mecardonia acuminata*.

3. Mecardonia tenuis Small.

Mecardonia tenuis Small, Fl. S. E. Un. St. 1065, 1338. 1903. "Type, Key West, Fla., Blodgett, in Herb. C. U." Type seen in Herb. Columbia University at the New York Botanical Garden.

Light loam over limestone, hammock and thickets, Key West, Florida Keys, Subtropical Florida. Endemic, but so close to *M. procumbens* and to *M. peduncularis* (Benth.) Small of Texas that the actual relationship of these species should be more fully investigated in the field.

Pennell (Florida)—9555, 9599.

6. GRATIOLA Linné.

Gratiola L., Sp. Pl. 17. 1753.

Type species, *G. officinalis* L., of Europe.

Corolla slightly exceeding calyx, externally glabrous. Capsule nearly pyramidal, acuminate. Pedicels very short.

Plant pubescent with several-celled hairs. Leaves 1–2 cm. long; bracts usually much exceeding the flowers.

1. *G. pilosa*.

Plant glabrous. Leaves .8–1.2 cm. long; bracts not exceeding the flowers.

1a. *G. pilosa epilis*.

Corolla more than twice as long as the calyx, externally more or less puberulent. Capsule broader, acute to rounded. Pedicels longer. Stem glabrous or puberulent with one-celled hairs, these frequently gland-bearing.

Pedicels exceeding 10 mm. in length. Corolla within throat on posterior side densely pubescent with knobbed hairs. Capsule ovate in outline, 1–5 mm. long, equaled or exceeded by the sepals. Seeds .3–.5 mm. long, semi-globose to oblong.

Capsule 1–3 mm. long, much exceeded by the sepals. Stem-leaves clasping by a broad base, usually at least the upper with resinous dots. Roots perennial, slender. Stoliferous.

Corolla golden-yellow throughout. Capsule 3 mm. long. Seeds brown. Leaves with blackish glandular dots.

2. *G. georgiana*.

Corolla with throat dull-yellow, the lobes white. Capsule 1–2 mm. long. Seeds paler. Leaves with brown glandular dots, these usually more sparsely distributed.

Leaf-blades linear-lanceolate to lanceolate, usually with a few coarse serratures. Sepals linear to linear-subulate. Capsule 1–2 mm. long.

3. *G. ramosa*.

Leaf-blades ovate, with many usually finer serratures. Sepals lanceolate to oblong-lanceolate. Capsule 2 mm. long.

4. *G. viscidula*.

Capsule 4–5 mm. long, about equaled by the sepals. Stem-leaves narrowed to a sessile or slightly clasping base, not

resinous-dotted. Roots apparently annual, the main root thick, and giving off numerous fibers. Not stoloniferous.

Corolla of earlier flowers 8–12 mm. long, not lined within, pubescent below anterior lobes with unknobbed hairs. Leaves prevailing lanceolate. 5. *G. neglecta*.

Corolla of earlier flowers 15–20 mm. long, purple-lined within, pubescent below anterior lobes with knobbed hairs. Leaves prevailing ovate. Pedicels more slender and usually longer. 6. *G. floridana*.

Pedicels less than 10 mm. long. Corolla within throat on posterior side pubescent with unknobbed hairs. Capsule globose, 5–6 mm. long, slightly exceeding the sepals. Seeds .7 mm. long, linear. Leaves and root as in *neglecta*.

7. *G. virginiana*.

1. *Gratiola pilosa* Michx.

Gratiola pilosa Michx., Fl. Bor. Amer. 1: 7. 1803. "Hab. in Carolinae inferioris uliginosis [A. Michaux]." Description sufficiently distinctive.

Moist or rather dry sandy pineland, common nearly throughout the Coastal Plain, south to central Florida; occasional inland, reaching the mountain-valleys of North Carolina and northern Alabama. Ranges from New Jersey to Florida, central Arkansas and eastern Texas.

Flowering from late May to September, and soon ripening fruit. Corolla white, throat distally with faint bluish-purple lines on all petals.

Pennell (Georgia)—10172. (Florida)—9671, 9682, 9709. (Alabama)—9721.

1a. *Gratiola pilosa epilis* Pennell, var. nov.

Plant throughout glabrous, or the sepals rarely with a few hairs. Leaves shorter, less evidently serrate. Corolla 7–9 mm. long. Calyx-lobes 4.5 mm. long, scarcely exceeding the capsule. Capsule browner than in the species.

Type, Myers, Lee Co., Florida, collected in flower and fruit July-August, 1900, A. S. Hitchcock 258, in United States National Herbarium; isotype in Herb. New York Botanical Garden.

Around ponds, southern Florida. Only the above specimens seen.

2. *Gratiola georgiana* Pennell, sp. nov.

Stem fleshy, glabrous, repent, ascending, 2–4 dm. long. Leaf-blades lanceolate to lanceolate-ovate, 1.5–2.5 cm. long, serrate to nearly entire, acute or acutish. Pedicels 7–15 mm. long. Calyx-lobes linear or nearly so, 4–8 mm. long. Corolla 8–12 mm. long, bright yellow. Capsule not seen.

Type, Augusta, Georgia, collected in flower by Dr. William Baldwin; in Herb. Academy of Natural Sciences of Philadelphia.

Wet pine-barrens, North Carolina⁵ to Florida and Alabama; also in southern Delaware. Not seen growing.

This has been confused with the northern *Gratiola aurea* Pursh, of which perhaps it should be counted a southern variety. They may be separated as follows:

Plant erect or repent-ascending, 1–3 dm. long. Leaf-blades linear to lanceolate, frequently denticulate distally. Pedicels 10–25 mm. long, usually equaling or exceeding the bracts.

G. aurea.

Plant repent and ascending, 2–4 dm. long. Leaf-blades lanceolate to lanceolate-ovate, usually more uniformly serrate. Pedicels 7–15 mm. long, shorter than the bracts.

G. georgiana.

Beside the collection of Baldwin, Rugel 99 (U, Y) from an unstated locality on Florida, and also collected very many years ago, is this species. The plant is also well described by Elliott, "Sketch Bot. S. C. & Ga.," 1: 13. 1816. It should be re-collected.

3. *Gratiola ramosa* Walt.

Gratiola ramosa Walt., Fl. Carol. 61. 1788. Type not verified, but descriptive of this plant common in lower South Carolina.

Gratiola quadridentata Michx., Fl. Bor. Amer. 1: 6. 1803. "Hab. in Carolina inferiore [A. Michaux]." Type not verified, but description sufficiently distinctive.

Moist or wet sandy pineland, edge of ponds, common in the Coastal Plain, South Carolina to southern Florida, west to southern Mississippi. Varies with frequently broader leaves inland, and with shorter fleshier leaves in southern Florida. In the spring erect, but later in the season the stems become lax, long and much branched.

Flowering from March to September, and soon ripening fruit. Corolla with tube dull-yellow, the lobes dull-white, the tube with longitudinal brown lines.

Pennell (Georgia)—9523. (Florida)—9657, 9669.

4. *Gratiola viscidula* Pennell.

Gratiola viscosa Schwein., Le Conte, Ann. Lyc. N. Y. 1: 106. 1824. "Inhabits Virginia, and the upper parts of North Carolina." The plant now considered, although the description appears inaccurate in stating that the capsule is as long as the sepals. Type, from Salem, North Carolina, seen in Herb. Academy of Natural Sciences of Philadelphia. Not *G. viscosa* Hornem., Enum. Pl. Hort. Hafn. 19. 1807.

Gratiola viscidula Pennell, Torreya 19: 145. 1919. New name for *G. viscosa* Schwein.

⁵ Reported as "*Gratiola aurea* Muhl." in Hyam's "Flora of North Carolina," N. C. Coll. A. & M. Arts, Bull. 164: 327. 1891; and in Mohr, Contrib. Nat. Herb. 6: 720. 1901, as from the Coast Plain of southern Alabama.

Swales and along streams, above the fall-line, through the Piedmont, ascending to the valleys of the southern Appalachians. Delaware to northern Georgia and eastern Tennessee.

Flowering from late June to September, and soon ripening fruit. Not seen growing.

5. *Gratiola neglecta* Torr.

Gratiola neglecta Torr., Cat. Pl. N. Y. 89. 1819. "Within thirty miles of the City of New York." Type probably seen in herbarium of Columbia University at the New York Botanical Garden. For discussion see Torrey 19: 146. 1919.

Wet loam, usually in deciduous woodland, frequent through the Piedmont, both east and west of the Appalachians; apparently not in the Coastal Plain, nor ascending appreciably into the mountains. Ranges across the continent northward, south in the East to northern Georgia and northern Alabama.

Flowering from April to June, and soon ripening fruit. Corolla with tube greenish-yellow, the lobes white, at times pinkish-tinged. Pennell (Georgia)—9509. (Alabama)—9760, 9769, 9784.

6. *Gratiola floridana* Nutt.

Gratiola floridana Nutt., Jour. Acad. Nat. Sci. Phila. 7: 103. 1834. "Hab. near Chipola, in West Florida [in Herb. Academy of Natural Sciences]." Type, labeled "*Gratiola * grandiflora*," collected in 1830, seen in Herb. Academy of Natural Sciences of Philadelphia.

Gratiola macrantha Chapm., Fl. S. Un. St. ed. III. 311. 1897. "Cool springs near Quincy, Middle Florida." Distinguished from *G. floridana* by having the staminodia present and relatively conspicuous. In this species, as in *G. neglecta*, the size of the rudiments of the antero-lateral stamens is quite variable.

Muddy banks and in wet woods, loam soil, in river-bottoms in the Coastal Plain, southern Georgia, southern Alabama and northern Florida; apparently occurring inland to the base of the mountains of northeastern Georgia and northeastern Alabama.

Flowering in April and May, fruiting in May and June. Corolla white, or pinkish on the lobes, yellow over base of the posterior lobes, and marked with longitudinal fine purple lines.

Pennell (Florida)—9704.

7. *Gratiola virginiana* L.

Gratiola virginiana L., Sp. Pl. 17. 1753. "Habitat in Virginia." For discussion of the type of this see S. F. Blake in *Rhodora* 20: 65. 1918.

Gratiola sphaerocarpa Ell., Sketch Bot. S. C. and Ga. 1: 14. 1816. "Grows in ponds 4 miles from Charleston [South Carolina], on the neck." Description distinctive, made from plants which flowered in the autumn. Type seen in the Elliott Herbarium at the Charleston Museum.

Gratiola megalocarpa Ell., l. c. 16. 1816. "Grows in ditches and pools from Pennsylvania to Carolina. Pursh." Ex Pursh, Fl. Amer. Sept. 12. 1814. "In ditches and pools: Pennsylvania to Carolina . . . v. v." With a plant of his own, Pursh combined an account of Walter's *Gratiola acuminata*; his own plant would appear to have been the species now

considered, although any extant type should be examined. Specimens from Salem, North Carolina, collected by Schweinitz and labeled "*megalocarpa*," seen in Herb. Academy of Natural Sciences of Philadelphia. *Gratiola caroliniensis* Le Conte, Ann. Lyc. N. Y. 1: 105. 1824. "Inhabits in wet grounds from Carolina to Florida." Description sufficiently distinctive. Probable type, collected by Le Conte at "Shallowford," seen in Herb. Academy of Natural Sciences of Philadelphia.

Wet loam, in shade, usually along streams, common through the Piedmont, not ascending into the Appalachians; and through the Coastal Plain south to central Florida. Ranges from New Jersey to Florida and Texas, inland in the Mississippi Valley to Illinois and Missouri.

Flowering from March to May, fruiting May to June. Corolla white, within with longitudinal purple lines, more pronounced on posterior side.

Pennell (Georgia)—9506. (Florida)—9705, 9714. (Alabama)—9726.

7. **SOPHRONANTHE** Benth.

Sophronanthe Benth.; Lindl., Nat. Syst. Bot., ed. II, 445. 1836.

Type species, *S. hispida* Benth.

1. **Sophronanthe hispida** Benth.

Sophronanthe hispida Benth., l. c. 445. 1836. "The plant was gathered by Drummond at Apalachicola." Isotype, Drummond 20, seen in Herb. Columbia University at the New York Botanical Garden.

Gratiola subulata Baldwin; Benth., in DC. Prod. 10: 405. 1846. "In Florida (. . . Baldwin! . . .)." Specimen collected by Baldwin, labeled "W. Florida, St. Marys river, south side," so probably an isotype, seen in Herb. Academy of Natural Sciences of Philadelphia.

Dry sandy pineland, Coastal Plain, southern Georgia to Louisiana, south through the Florida peninsula to Dade County.

Flowering from late April to September, and soon ripening fruit; in southern Florida flowering and fruiting throughout the year. Corolla with tube externally yellowish-white, on lobes and within white.

Pennell (Georgia)—9528. (Florida)—9660, 9676, 9689, 9700.

8. **RANAPALUS** Kellogg.

Ranapalus Kellogg, Proc. Calif. Acad. 7: 113. 1877.

Type species, *R. eisenii* Kell., of California.

1. **Ranapalus rotundifolius** (Michx.) Pennell, comb. nov.

Monniera rotundifolia Michx., Fl. Bor. Amer. 2: 22. 1803. "Hab. in regione Illinoensi [A. Michaux]." Type not verified, but description sufficiently distinctive.

Aquatic in shallow mud-bottomed open ponds, central and western Tennessee. Through the Mississippi Valley from Indiana and Tennessee to North Dakota, eastern Colorado and northern Texas.

Flowering from July to September, and soon ripening fruit. Corolla with throat yellow within, the lobes white.

9. **BRAMIA** Lamarck.

Bramia Lam., Encyc. Meth., Bot. 1: 459. 1785.

Type species, *B. indica* Lam., of India.

1. **Bramia monnieri** (L.) Pennell, comb. nov.

Lysimachia monnieri L., Cent. Pl. 2: 9. 1756. "Habitat in America meridionali. Hallman." D. Z. Hallman sent to Linné specimens from Spain, so it would appear that the type of this was probably transmitted through him from some source in Spanish America.

Monniera cuneifolia Michx., Fl. Bor. Amer. 2: 22. 1803. "Hab. in locis mari inundatis Carolinae inferioris [A. Michaux]." Description sufficiently distinctive. Type of the genus *Habershamia* Raf., Neogyn. 2. 1825.

Bramia monnieri (L.) Drake, Fl. Polyn. Franc. 142. 1892.

Sandy beaches, especially where subject to inundation, common within tidewater, both where brackish and where fresh, growing also in pools in the sand dunes, in the coastal pine-land, and inland up the river-courses as far as Lake Okeechobee; on and near the coast, North Carolina to Florida and Texas. A widespread maritime plant of both the New World and Old World Tropics. Variable in size of its vegetative parts, and even of its flowers, plants every-way smaller occurring especially in drier situations and around the pineland pools.

Flowering in southern Florida throughout the year, northward from April to November; soon ripening fruit. Corolla with tube yellowish within, elsewhere white, or frequently tinged with pink. Anthers dark-purple.

Pennell (Florida)—9534, 9537, 9665.

10. **HYDROTRIDA** Small.

Hydrotrida Small, Fl. Miami 165. 1913.

Type species, *Obolaria caroliniana* Walt.

1. **Hydrotrida caroliniana** (Walt.) Small.

Obolaria caroliniana Walt., Fl. Carol. 166. 1788. Type not verified, but description sufficiently distinctive. Doubtless from lower South Carolina, a district where the species now considered is frequent.

Monniera amplexicaulis Michx., Fl. Bor. Amer. 2: 22. 1803. "Hab. in fossis, stagnis Carolinae [A. Michaux]." Type not verified, but description sufficiently distinctive.

Monniera crenulata Small, Bull. Torr. Bot. Club 22: 46. 1895. "Found by Mr. A. H. Curtiss, growing in the bottom of ditches between Jacksonville and Trout Creek, Florida, on July 13, 1893." Type seen in Herb. Columbia University at the New York Botanical Garden. This represents but a robust, broad-leaved state of the species.

Hydrotrida caroliniana (Walt.) Small, Fl. Miami 165. 1913.

Aquatic in shallow water, sandy soil, edges of ponds and in small streams, in pineland in the Coastal Plain, North Carolina to Florida

and Louisiana, south through the Florida peninsula to the Everglades.

Flowering from May to September, and soon ripening fruit; in southern Florida flowering and fruiting throughout the year. Corolla uniformly sky-blue.

In the herbarium of Columbia University is a memorandum description of this by Boykin. He proposed it as a new genus, but his name "Beyrichia" was preoccupied, and unfortunately no name was substituted and his suggestion has lain unheeded.

Pennell (Florida)—9675, 9683.

11. *HERPESTIS* Gaertner, f.

Herpestis Gaertn. f., *Fruct. et Sem. Pl.* 3: 186. 1807.

Type species, *H. rotundifolia* Gaertn. f.

1. *Herpestis rotundifolia* Gaertn. f.

Herpestis rotundifolia Gaertn. f., l. c. 186. pl. 214. 1807. "E America septentrionali a Dno Bosc, ex collectione Desfontaines." Bosc collected in Carolina, and his plant, as shown from the parts described, is certainly the species now considered. While Gaertner was doubtless influenced in his selection of a name by Michaux' *Monniera rotundifolia*, 1803, Bosc's plant is stated to be only perhaps this. Moreover Michaux' name is not connected with the phrase "*Herpestis rotundifolia*," so that we must consider this combination as here originating for the plant of Bosc. This has been confused with *Gratiola repens* Sw., a species of *Ranapalus*.

In shallow water, muddy shores, within the Coastal Plain, Maryland to Florida. Also in the West Indies. Very few collections are known, and in our area only the following stations have been noted: Wilmington, North Carolina; Ogeechee, Georgia; Jacksonville and Eustis, Florida. While doubtless often overlooked, the plant is certainly of scattered and rare occurrence.

Flowering at least from July to September, and soon ripening fruit. Not seen growing.

12. *AMPHIANTHUS* Torrey.

Amphianthus Torr., *Ann. Lyc. N. Y.* 4: 82. 1837.

Type species, *A. pusillus* Torr.

1. *Amphianthus pusillus* Torr.

Amphianthus pusillus Torr., l. c. 82. 1837. "Hab.—In small excavations on flat rocks, where the soil is wet during the flowering season; Newton County, Georgia . . . Dr. M. C. Leavenworth!" Type seen in Herb. Columbia University at the New York Botanical Garden.

"Growing in water in very shallow depressions in granite rock," Stone Mountain and nearby granite hills of Dekalb and Newton counties, central Georgia.

Flowering in April, fruiting in May. Not seen growing.

Apparently this plant only flourishes during wet seasons. On April 25, 1917, I searched most carefully for it on the summit and slopes of Stone Mountain (Canby's record of May 15, 1869, specifies "the summit"), but found no trace whatever. The season had been dry and there were no pools.

A remarkable plant with a unique dimorphic habit. It should be carefully studied living in order to assist in discovering its real relationship. Certainly aberrant in *Gratiolææ*, it may possibly belong to the *Veroniceææ*, as is suggested by the fruit. This was long ago the thought of Dr. Leavenworth as shown by his notes preserved in the herbarium of Columbia University.

13. ILYSANTHES Rafinesque.

Ilysanthes Raf., Ann. Nat. 13. 1820.

Type species, *I. riparia* Raf., of the banks of the Ohio.

Stem erect or ascending. Leaf-blades more or less elongate, the lower ones narrowed at the base.

Pedicels stout, shorter than the subtending bracts. Sepals usually as long as the capsule. 1. *I. dubia*.

Pedicels filiform, longer than the subtending bracts. Sepals shorter than the capsule.

Upper leaves or bracts but slightly smaller than the lower.

Pedicels erect or ascending (or in fruit rarely slightly reflexed). Leaves mainly cauline.

Stem-leaves partially clasping, all opposite, none of the leaves obviously punctate. Sepals decidedly shorter than the capsules. 2. *I. inaequalis*.

Stem-leaves sessile or narrowed at base, frequently in threes, the leaves all evidently glandular-punctate. Sepals scarcely shorter than the capsule. 3. *I. saxicola*.

Upper leaves or bracts reduced to scales. Pedicels conspicuously reflexed in fruit. Leaves mainly basal.

4. *I. refracta*.

Stem repent or prostrate throughout. Leaf-blades orbicular or ovate-orbicular, rounded at the base and closely sessile.

5. *I. grandiflora*.

1. *Ilysanthes dubia* (L.) Barnhart.

Gratiola dubia L., Sp. Pl. 17. 1753. "Habitat in Virginiae aquis. . . . Gron. virg. 129." Type, Clayton 164, identified by Dr. B. L. Robinson in *Rhodora* 10: 67. 1908, as the species here considered.

Capraria gratioloidea L., Syst. ed. X. 1117. 1759. Based upon *Gratiola dubia* L.

Gratiola tetragona Ell., Sketch Bot. S. C. and Ga. 1: 15. 1816. "Grows in ponds and ditches four miles from Charleston [South Carolina]." Type seen in the Elliott Herbarium at the Charleston Museum.

Lindernia attenuata Muhl.; Ell., l. c. 17. 1816. "Grows in wet places. Vall' Ombrosa, Ogechee, Georgia. Type seen in the Elliott Herbarium at the Charleston Museum. Isotype in Herb. Columbia University at the New York Botanical Garden.

Ilysanthes dubia (L.) Barnhart, Bull. Torr. Bot. Club 26: 376. 1899.

Swamps, and stream margins, especially in groves or woodland, loam soil, through the southern Appalachians and the Piedmont, both east and west of the mountains, apparently more frequent northward; in the Coastal Plain occasional or local, in heavier soils, along river-bottoms and along the coastal bays. Ranges from New Brunswick and Ontario south to northern Florida; also in the West Indies and South America. In the lower Piedmont and Coastal Plain forms transitional to *I. inaequalis* occur.

Flowering from May to September, and soon ripening fruit. Corolla pale lavender, deeper in color near margin of lobes, and within along the antero-lateral ridges with short yellow hairs.

Pennell (Florida)—9707. (Alabama)—9723.

2. *Ilysanthes inaequalis* (Walt.) Pennell.

Gratiola inaequalis Walt., Fl. Carol. 61. 1788. Type not verified, but is from lower South Carolina where the plant here considered is frequent. Walter's species was interpreted as this plant by Elliott, the most critical student of the Carolina flora.

Gratiola anagallidea Michx., Fl. Bor. Amer. 1: 6. 1803. "Hab. in humidis Carolinae [A. Michaux]." Type not verified.

Lindernia dilatata Muhl.; Ell., Sketch Bot. S. C. and Ga. 1: 16. 1816. "Grows in ditches, around ponds." Type seen in the Elliott Herbarium at the Charleston Museum. It is labeled "Vall Ombrosa," whereas that of *L. attenuata* bears no definite indication of locality. The first good characterization of this species.

Gratiola dilatata Muhl.; Spreng., Syst. 1: 39. 1825. "Carolin[a]." Surely based upon *Lindernia dilatata* Muhl., but this not cited.

Ilysanthes inaequalis (Walt.) Pennell, Torreya 19: 149. 1919.

Swamps, loam and more usually in sandy soil, frequently in open situations, pineland pools and edges of hammocks, through the Coastal Plain, frequent or local; extending inland locally into the Piedmont. Ranges from Massachusetts to Florida and Texas; apparently also in Colorado, the Pacific Coast states, in Mexico, the West Indies, Central and South America. Intergrades with *Ilysanthes dubia*.

Flowering from March to September, and soon ripening fruit. Corolla as in *I. dubia*.

Pennell (Florida)—9649, 9673. (Alabama)—9768.

3. *Ilysanthes saxicola* (M. A. Curtis) Chapm.

Lindernia saxicola M. A. Curtis, Amer. Journ. Sci. 44: 83. 1843. "On rocks in the Hiwassee River [North Carolina] [M. A. Curtis]. . . ." Isotype seen in Herb. Columbia University at the New York Botanical Garden.

Ilysanthes saxicola (M. A. Curtis) Chapm., Fl. S. Un. St. 294. 1860.

On rocks in rapid mountain-streams, known only from the Hiwassee River in North Carolina, and from the headwaters of the Savannah River at Tallulah Falls, northern Georgia.

Flowering at least in August and September, and soon ripening fruit. Not seen growing.

4. *Ilysanthes refracta* (Ell.) Benth.

Lindernia refracta Ell., Sketch Bot. S. C. and Ga. 1: 579. 1821. "Grows around the margins of ponds in Barnwell district, South Carolina; in Burke County, and near Milledgeville, Georgia." Type, "Hab. in sphagnis, Barnwell Co., So. Car.," seen in Elliott Herbarium at the Charleston Museum.

Tittmannia monticola Spreng., Syst. 2: 800. 1825. "Carolina bor. (*Lindernia monticola* Nutt.)." The name of Nuttall was a *nomen nudum*, and Nuttall (Gen. Am. 1: 9. 1818) says, perhaps due to a typographic slip, "from the hills of New Hampshire." But that the name *monticola* was in use before the date of Sprengel's publication is proven by the existence of old specimens labeled "*Lindernia monticola*," collected by Schweinitz probably in North Carolina. Such a specimen, in the herbarium of Columbia University at the New York Botanical Garden, is probably an isotype of *T. monticola*, and is *Ilysanthes refracta*.

Ilysanthes refracta (Ell.) Benth., in DC. Prod. 10: 419. 1846.

Moist sandy soil, shallow depressions in pineland, in the Coastal Plain from South Carolina to northern Florida and eastern Alabama; inland on the granite of central Georgia and eastern Alabama, and likewise in the Piedmont of central North Carolina, doubtless also on granite.

Flowering from March to September, and soon ripening fruit. Corolla externally violet-purple, paler on the anterior side, within paler, but with three violet-purple streaks below the posterior sinuses, a horizontal band of violet-purple on anterior side just within the mouth, and with darker blotches below the anterior sinuses.

Pennell (Georgia)—4053, 9510, 9522.

5. *Ilysanthes grandiflora* (Nutt.) Benth.

Lindernia grandiflora Nutt.; Gen. Amer. 2: 43. 1818. "Hab. On the spongy margins of sandy springs and ponds in Georgia, (betwixt Savannah and Augusta in many places)." Type seen in Herb. Academy of Natural Sciences of Philadelphia.

Ilysanthes grandiflora (Nutt.) Benth. in DC. Prod. 10: 418. 1846.

Moist sandy soil, especially along streams, in longleaf pineland, and southward in the Everglades, southern Georgia to southern Florida.

Flowering from March to at least July, probably to September, and soon ripening fruit. Corolla externally violet-blue, paler on anterior side; posterior lobes externally pale purplish-blue, within very pale and with light-violet median line; anterior lobes white externally and within, excepting for two violet-blue blotches near the bases of the lobes.

Pennell (Florida)—9654, 9670, 9672.

14. **GLOBIFERA** J. F. Gmelin.

Globifera J. F. Gmel., Syst. 2: 32. 1791.

Type species, *Anonymos umbrosa* Walt.

1. **Globifera umbrosa** (Walt.) J. F. Gmel.

Anonymos umbrosa Walt., Fl. Carol. 63. 1788. Type, probably from lower South Carolina, identified by Dr. S. F. Blake, in *Rhodora* 17: 131. 1915, as the species here considered.

Micranthemum orbiculatum Michx., Fl. Bor. Amer. 1: 10. pl. 2. 1803. Type not verified, but description and plate evidently of species here considered. Type of genus *Micranthemum* Michx.

Micranthemum emarginatum Ell., Sketch Bot. S. C. and Ga. 1: 18. 1816. "Grows in ditches and wet places—Vall'Ombrosa, Great Ogechee." Type seen in Elliott Herbarium at the Charleston Museum. Said to be "in the upper country, common," and characterized from the "very common" (and evidently lowland) *M. orbiculatum* by its more remote and larger leaves. *Globifera umbrosa* varies considerably in size of leaves, but the ample collections at hand show this to be ecologic, and not to distinguish plants of differing range.

Wet loam or in shallow water, in woodland, especially in river-bottoms, locally common throughout the Coastal Plain, especially near the ocean, North Carolina to central Florida and eastern Texas; rarely reported from above the fall-line. Also in eastern Mexico and the West Indies.

Flowering from May to October, and soon ripening fruit. Corolla uniformly dull-white. Anthers red-brown.

Pennell (Florida)—9706.

15. **HEMIANTHUS** Nuttall.

Hemianthus Nutt., Journ. Acad. Nat. Sci. Phila. 1: 119. pl. 6. 1817.

Type species, *H. micranthemoides* Nutt., of Pennsylvania.

1. **Hemianthus glomeratus** (Chapm.) Pennell, comb. nov.

Micranthemum nuttallii glomeratum Chapm., Fl. S. Un. St. ed. III. 313. 1897. "Rivers and wet banks, South Florida." Type not verified.

Sandy shores of lakes and rivers, known from Lake Okeechobee and along the Gulf coast from Tampa to the Caloosahatchee River, southern Florida.

Flowering and fruiting probably throughout the year, the specimens seen collected in May and November. Not seen growing.

This may be distinguished from the other species of the eastern United States, *Hemianthus micranthus* (Pursh) Pennell (*H. micranthemoides* Nutt.) of the Delaware and Chesapeake drainage by the following contrast:

Calyx-lobes obtuse or obtusish, less than one-fourth the length of the tube. Anterior lobe of the corolla nearly as long as the portion of the anterior lip below the base of the lateral lobes.

H. micranthus.

Calyx-lobes acute, one-third to one-half the length of the tube. Anterior lobe of the corolla about half as long as the portion of the anterior lip below the base of the lateral lobes.

H. glomeratus.

16. LEUCOSPORA Nuttall.

Leucospora Nutt., Journ. Acad. Nat. Sci. Phila. 7: 87. 1834.

Type species, *Capraria multifida* Michx.

1. Leucospora multifida (Michx.) Nutt.

Capraria multifida Michx., Fl. Bor. Amer. 2: 22. pl. 35. 1805. "Hab. in ripis arenosis fluminum amniculorumque, in *Tennassée* et Illinoensi regione." Type not verified, but description and plate certainly of species here considered.

Leucospora multifida (Michx.) Nutt., l. c. 87. 1834.

Sandy or loam banks of brooks or rivers, in open meadows or along shores, also in "Cedar Glades," Tennessee west of the Cumberland Mountains, to western Alabama and central Mississippi. Ranges from southwestern Ontario to Kansas, south to Alabama and Texas.

Flowering from June to October, and soon ripening fruit. Corolla pale-lavender, deeper on lobes, and lined with deeper lavender; tube within at base greenish-yellow, then yellow on the anterior side, and toward mouth with a purplish ring; white at base of the lavender anterior lobes. This plant has been placed in the very different tropical genus *Conobea* Aubl.

17. VERBASCUM Linné.

Verbascum L., Sp. Pl. 177. 1753.

Type species, *V. thapsus* L., of Europe.

Stem glabrous or with simple gland-tipped hairs above. Leaves glabrous. Pedicels 10–15 mm. long. Filaments all densely lanose with knobbed purple hairs. Capsule subglobose, glandular-puberulent. Seeds .8–.9 mm. long, dark-gray.

1. *V. blattaria.*

Stem pubescent with stellate glandless hairs. Leaves, at least beneath, pubescent. Pedicels less than 10 mm. long. Filaments: three posterior lanose, two anterior sparingly lanose to glabrous, with filiform yellow hairs. Capsules ovoid to oblong, stellate-pubescent. Seeds .4–.7 mm. long, brownish-gray.

Leaf-blades crenate, glabrate above, those of the stem sessile. Pedicels usually several in an axil. Sepals about one-half length of capsule. Inflorescence not densely crowded.

Inflorescence a simple raceme, the pedicels 1–5 to an axil. Capsule globose, 7–8 mm. long. Leaves green and slightly pubescent beneath.

2. *V. virgatum.*

Inflorescence a panicle of racemes, the pedicels 3–12 to an axil. Capsule oblong or oblong-ovoid, 4–5 mm. long. Leaves white and densely stellate-tomentose beneath.

3. *V. lychnitis*.

Leaf-blades entire or but obscurely crenate, densely pubescent above, those of the stem decurrent. Pedicels one to an axil. Sepals equaling the capsule. Inflorescence densely crowded.

4. *V. thapsus*.

1. ***Verbascum blattaria* L.**

Old fields and roadsides, throughout area north of central Florida. Naturalized from Eurasia.

2. ***Verbascum virgatum* With.**

Berkeley Co., South Carolina. Naturalized from Eurasia.

3. ***Verbascum lychnitis* L.**

Old fields and roadsides, occasional in North Carolina. Naturalized from Eurasia.

4. ***Verbascum thapsus* L.**

Old fields, roadsides and thickets, throughout area north of central Florida, usually common. Naturalized from Eurasia.

18. **PENSTEMON** [Mitchell] Schmidel.

Penstemon Schmidel, Icon. Pl. 2. 1762.

Type species, *Chelone penstemon* L.

Leaf-blades dimorphic, those of the prostrate wintering stems entire or few-toothed, those of the erect flowering stems bipinnatifid with linear segments. Corolla pink-purple, its throat strongly inflated and but obscurely ridged anteriorly. Anther-sacs shallowly saccate. Sterile filament conspicuously exerted.

1. *P. dissectus*.

Leaf-blades uniform, entire or merely toothed. Corolla reddish-purple to white, its throat moderately to slightly inflated, obviously ridged anteriorly. Sterile filament included or slightly exerted.

Anther-sacs dehiscent by short proximal slits, the distal portion of each remaining pouch-like. Leaf-blades entire or essentially so. Branches of the inflorescence elongate. Corolla white, unlined, nearly glabrous within the throat.

2. *P. multiflorus*.

Anther-sacs dehiscent their entire length, so never pouch-like. Leaf-blades more or less serrate. Branches of the inflorescence less elongate. Corolla lanose within, nearly always with more or less conspicuous lines of deeper color within on the anterior side.

Corolla with throat relatively inflated, its mouth open, not closed by the anterior lip. Sterile filament slightly to moderately densely bearded. Plants taller.

Corolla white, rather strongly inflated. Anther-sacs usually barbate. Stem glabrous or nearly so.....3. *P. digitalis*.

Corolla more or less violet-purple, moderately inflated. Anther-sacs glabrous. Stem usually puberulent.

Corolla more open, its throat anteriorly shallowly two-ridged, and with broader less evident lines. Anther-sacs grayish. Sterile filament included, slightly bearded. Stem finely puberulent.

Calyx-lobes becoming 4-7 mm. long, one-half to two-thirds the length of the capsule. Corolla 20-25 (-28) mm. long, usually light violet-purple. Leaf-blades lanceolate, sparsely serrate. 4. *P. pentstemon*.

Calyx-lobes becoming 8-10 mm. long, equaling the capsule. Corolla 25-35 mm. long, usually deeper violet-purple. Leaf-blades broadly lanceolate, usually more serrate. 5. *P. calycosus*.

Corolla narrower, its throat within strongly two-ridged anteriorly, and (at least in *P. canescens*) with narrow sharply defined lines. Anther-sacs violet-purple. Sterile filament slightly exerted, moderately bearded. Stems more loosely puberulent.

Blades of the cauline leaves tapering from the broad base, more serrate, glabrous or nearly so. Corolla "bright pink-purple." Capsule broadly ovoid.

6. *P. smalkii*.

Blades of the cauline leaves usually narrowed from above the narrower base, less serrate, more pubescent. Corolla faint violet-purple, conspicuously lined within throat. Capsule ovoid.

7. *P. canescens*.

Corolla with throat scarcely inflated, its mouth closed by the anterior lip, which rises as a convex arc. Sterile filament very densely bearded. Plants lower.

Corolla 20-25 mm. long, broader, red-purple, throat deeply lined within, white on anterior lobes within. Sterile filament bearded with golden-yellow hairs.

8. *P. australis*.

Corolla 25-30 mm. long, very narrow and slender, white throughout. Sterile filament bearded with lemon-yellow hairs.

9. *P. tenuiflorus*.

1. *Penstemon dissectus* Ell.

Penstemon dissectus Ell., Sketch Bot. S. C. and Ga. 2: 129. 1822. "This species was sent me . . . from Louisville, Georgia, by Mr. Jackson." Type seen in the Elliott Herbarium at the Charleston Museum.

Light gravelly soil, rock-ledges, rock outcrops of Altamaha Grit, southern Georgia.

Flowering in April and May, fruiting in June. Corolla violet-purple, externally slightly redder, paler on anterior side, within

bluer on lobes, paler within throat and in a triangle at base of each lobe, the throat within with fine longitudinal violet-purple lines. Sterile filament with slightly yellowish hairs.

The peculiar dimorphism of the leaves of this species, as well as the occurrence of bipinnatifid leaf-blades, is unique in this genus.

Pennell (Georgia)—9527.

2. *Penstemon multiflorus* Chapm.

Penstemon pubescens multiflorus (Chapm.) Benth. in DC. Prod. 10: 327. 1846. "In Louisiana et Florida. *P. multiflorus* Chapm. mss." Specimens seen in Herb. Columbia University at the New York Botanical Garden, from "sandy pine woods, between Mariana & St. Andrew's Bay," collected by A. W. Chapman "Oct., 1838," and labeled "probably a distinct species," is probably an isotype.

Penstemon multiflorus Chapm.; Small, Fl. S. E. Un. St. 1061. 1903.

Sandy or gravelly soil, scrub-oak land or pine land, through peninsular Florida, and westward through Middle Florida to the West Florida Pine Hills, and in extreme southern Georgia.

Flowering from May to July, and soon ripening fruit, southward flowering and fruiting throughout the year. Corolla white, within slightly purple on proximal part of tube, and sometimes on the lobes.

Pennell (Florida)—9539, 9548, 9644.

3. *Penstemon digitalis* Nutt.

Chelone digitalis (Nutt.) Sweet, Brit. Fl. Gard. pl. 120. 1825. "*Penstemon Digitalis* Nutt. . . . Found by Mr. Nuttall in the Arkansas territory of North America. . . . The plant from which our drawing was taken was received last autumn from New York, by Mr. Anderson, of the Apothecaries' Garden at Chelsea, to whom it was sent by Mr. Hogg." A careful description and illustration, certainly of the plant now considered, the description being apparently more accurate than Nuttall's own in mentioning the pubescence of the anthers.

Penstemon digitalis Nutt., Trans. Amer. Phil. Soc. ser. II. 5: 181. 1837. "Hab. in wet woods and prairies [Arkansas Territory]; common. [T. Nuttall.]" Possible type, labeled "*Penstemon latifolium*, Arkansa, Nuttall," seen in Herb. Columbia University at the New York Botanical Garden. Described without reference to *Chelone digitalis*.

Fields and edges of woodland, loam, western Tennessee and near Birmingham, Alabama, probably elsewhere northward. Native in the southwestern Mississippi valley; extensively introduced into the northeastern United States, and probably an introduction into the southeastern flora.

Flowering in May and June, fruiting in August and September. Corolla white throughout, or within on the anterior side with more or less evident violet lines.

4. *Penstemon pentstemon* (L.) Macm.

Chelone pentstemon L., Sp. Pl. 612. 1753. "Habitat in Virginia." Type not verified, but must have been the species here considered, because in 1753 this was certainly the only essentially glabrous species of the Atlantic seaboard.

Penstemon laevigatus Ait., Hort. Kew. 2: 361. 1789. "*Chelone Penstemon* J. F. Miller ic. 4. . . . Nat. of North America. Cult. 1776, by John Fothergill, M. D." The description, and also the plate of Miller, clearly denote the species now considered.

Bartramia pulchella Salisb., Prod. Stirp. Chapel Allerton 99. 1796. New name for *Penstemon laevigatus* Ait. Type of genus *Bartramia* Salisb.

Penstemon pentstemon (L.) Macm., Bull. Torr. Bot. Club 19: 15. 1892.

Meadows, river-banks and edges of forest, loam or clay, frequent or common through the Piedmont, both east and west of the mountains, and through the lower valleys of the southern Appalachians: descending along river-banks slightly into the Coastal Plain. Ranges from Virginia to northern Florida and Louisiana, and inland probably to Illinois; perhaps introduced westward.

Flowering from mid-May to mid-June, fruiting in July and August. Corolla externally violet-purplish, deepest on tube, on throat and lobes pale-purplish, nearly white on anterior side; within white, and within throat on anterior side with more or less evident violet lines. Sterile filament with yellow hairs.

Pennell (Georgia)—9787. (Alabama)—9746, 9756, 9780.

5. *Penstemon calycosus* Small.

Penstemon calycosus Small, Bull. Torr. Bot. Club 25: 470. 1898. "Nashville, Tennessee." This refers to a note in Bull. Torr. Bot. Club 21: 304. 1894, reporting the occurrence of "*Penstemon Smallii*" and stating: "Mr. Bicknell has lately discovered this . . . at Nashville, Tennessee. He remarks that it grows plentifully on the bluffs of the Cumberland River about that city." Type seen in Herb. Columbia University at the New York Botanical Garden.

Rocky places, limestone ledges, in forest, Tennessee Basin and lower slopes of the Cumberland Mountains, central and eastern Tennessee, and northern Alabama. Ranges northward to Indiana and Illinois.

Flowering from mid-May to mid-June, fruiting in July. Corolla externally violet-purple (redder than in *P. pentstemon*), deeper posteriorly, fainter to white on anterior side; within nearly white within throat, on lobes faintly violet-purple, and with a few obscurely violet-purple lines within throat on anterior side. Sterile filament with yellowish hairs.

Pennell (Alabama)—9772.

6. *Penstemon smallii* Heller.

Penstemon smallii Heller, Bull. Torr. Bot. Club 21: 25. 1894. "Collected by the writer on Blowing Rock Mountain, Caldwell County, N[orth] C[arolina], July 21, 1890, at an elevation of 4000 feet. . . . Early in June, 1891, the locality was again visited in company with Mr. John K. Small." Type, Blowing Rock Mountain, Watauga Co., collected in flower June 10-20, Small & Heller 451, seen in Herb. Columbia University at the New York Botanical Garden. Isotype in Herb. Academy of Natural Sciences of Philadelphia.

Rocky lower mountain-slopes and on river-bluffs, in forest, Appalachians of North Carolina, eastern Tennessee and northernmost Georgia. Ranges northward into southwestern Virginia.

Flowering from late May to late June, fruiting in July. Not seen growing.

7. *Penstemon canescens* (Britton) Britton.

Penstemon laevigatus canescens Britton, Mem. Torr. Bot. Club 2: 30. 1890. "High, rocky banks of the Roanoke River [near Roanoke, Virginia, May, 1890, A. M. Vail and others]." Type, collected May 29, labeled by Dr. Britton who was of the party, seen in Herb. Columbia University at the New York Botanical Garden.

Penstemon canescens (Britton) Britton, l. c. 5:291. 1894.

Rocky loam, in open forest, lower mountain slopes, in the eastern Appalachians seen only from near the French Broad River in North Carolina; through at least the southern Cumberlands (abundant on Lookout Mountain), and in extreme northwestern Georgia (and doubtless northeastern Alabama).

Flowering in May and June, fruiting in July and August. Corolla externally faint violet-purple, within nearly white, and on the anterior side with eleven narrow sharply defined deep violet purple lines. Sterile filament with pale brownish yellow hairs.

Pennell (Georgia)—9785. (Tennessee)—5717, 9788.

8. *Penstemon australis* Small.

Penstemon australis Small, Fl. S. E. Un. St. 1060, 1337. 1903. "Type, Nash, Pl. Fla., 1822, in Herb. C. U." Type, Eustis, Lake County, Florida, collected in flower and fruit May 28-June 15, 1895, seen in Herb. Columbia University at the New York Botanical Garden.

Dry sandy soil, fields, scrub oak and pine land, through the Coastal Plain from North Carolina to central Florida and eastern Texas, mostly common; inland to the granite of central Georgia, and in upper South Carolina. Usually with broader leaves inland, while in the pine-barrens of the Coastal Plain the cauline may be fewer and usually much smaller so that the stem appears somewhat scapose.

Flowering in April and May, fruiting in June and July. Corolla externally reddish-purple, paler on anterior side; within red-purple on posterior lobes with on each a fine median line of deeper color, anterior lobes white, with deep red-purple streaks, three to each lateral lobe, and five, which anastomose distally, to the median lobe. Sterile filament with yellow hairs.

This and other southern species have been freely listed as "*Penstemon pubescens*" or "*P. hirsutus*," a northern plant, with lavender corollas, and not definitely known from our area.

Pennell (North Carolina)—4944. (Georgia)—4032, 9515, 9525. (Florida)—9680, 9694, 9708.

9. *Penstemon tenuiflorus* Pennell.

Penstemon tenuiflorus Pennell, *Addisonia* 4: 79. pl. 160. 1919. "The type specimen was collected in loam soil in open pineland, three miles southeast of Albany, Morgan County, Alabama, on May 27, 1917, my number 9753, and is preserved in the herbarum of the New York Botanical Garden."

Stem 3–6 dm. tall, whitish-puberulent. Blades of the cauline leaves 3–9 cm. long, obscurely serrulate, puberulent to pubescent. Panicle narrow, its branches glandular-pubescent. Calyx-lobes ovate, 3–5 mm. long. Corolla 25–30 mm. long, its throat narrowly arched and keeled posteriorly, flattened and strongly two-ridged within anteriorly; externally glandular-puberulent, within pubescent with yellow hairs over the projecting bases of the anterior lobes; white, faintly tinged externally and on margins of lobes with violet, not lined within throat. Posterior lobes united two-thirds their length, their free portions erect-recurved. Sterile filament distally densely bearded with short lemon-yellow hairs. Capsule not seen.

Open woodlands, in loam soil, western Tennessee and northern Alabama. Ranges north to Illinois and west to Oklahoma.

Pennell (Alabama)—9753.

19. CHELONE Linné.

Chelone L., Sp. Pl. 611. 1753.

Type species, *C. glabra* L.

Leaf-blades sessile and somewhat clasping.

1. *C. cuthbertii*.

Leaf-blades manifestly petioled.

Leaf-blades of a lanceolate type, narrowed to short petioles.

Corolla cream-white, white-lanose within the throat. Sepals obscurely or not ciliate.

2. *C. glabra*.

Leaf-blades of an ovate type, slightly cordate or narrowed into petioles 1.5–3 cm. long. Corolla rose-purple, yellow-lanose within the throat. Sepals evidently ciliate. 3. *C. lyonii*.

1. *Chelone cuthbertii* Small.

Chelone cuthbertii Small, Fl. S. E. Un. St. 1058, 1337. 1903. "Type, Highlands, N. C., Cuthbert, no. 283, in N. Y. B. G." Type, collected in flower August, 1897, in a wet meadow, at an altitude of 3800 feet, seen in Herb. New York Botanical Garden.

Wet meadows, western North Carolina. Little known, and the relation between this and *C. glabra* should be studied in the field.

Flowering in August. Not seen growing.

2. *Chelone glabra* L.

Chelone glabra L., Sp. Pl. 611. 1753. "Habitat in Virginia, Canada." Based upon a plant grown in the Clifford Garden in Holland. Description sufficiently distinctive.

Wet meadows and woodland swamps, through the southern Appalachians and Piedmont, common northward; descending into

the Coastal Plain in river-valleys, reaching Florida, probably near the Apalachicola River. Ranges from Newfoundland to Manitoba, south to northern Florida, and Kansas.

Flowering in late September and October, fruiting probably in October and November. Corolla cream-white, more or less pink-tinged within posterior lip, on anterior lobes, and laterally along anterior lip; occasionally entirely pink.

The forma *tomentosa* (Raf.) Pennell (in *Torrey* 19: 117. 1919), with leaves tomentose or pubescent beneath, is to be looked for in our area.

3. *Chelone lyonii* Pursh.

Chelone lyonii Pursh, Fl. Amer. Sept. 2: 737. 1814. "In Upper Carolina and Georgia. Lyon. . . . v. s. in Herb. Lambert."

Chelone major Sims, Bot. Mag. 44: pl. 1864. 1816. "Introduced by the late Mr. Lyons, from Carolina. . . . Communicated by Mr. Lambert, from Boyton, . . ." Obviously of the same origin as *C. lyonii* Pursh, and with a distinctive illustration.

Chelone latifolia Muhl.; Ell., Sketch Bot. S. C. and Ga. 2: 127. 1822. "This plant . . . was discovered . . . by Mr. Lyon along the base of the mountains of Carolina, but principally in Burke County, N. C." Description obviously of the species now considered. Described as having ovate leaf-blades, tapering at base, in contrast to the cordate blades of *C. lyonii* Pursh. This species shows complete gradation in leaf-form between these two states.

Moist mountain-woodland, eastern Appalachians, North Carolina and Tennessee, said to occur southward to northeastern Alabama.⁶

Flowering from mid-July to mid-September, fruiting in September and October. Not seen growing.

20. *SCROPHULARIA* Linné.

Scrophularia L., Sp. Pl. 619. 1753.

Type species, *S. nodosa* L., of Europe.

1. *Scrophularia marilandica* L.

Scrophularia marilandica L., l. c. 619. 1753. "Habitat in Virginia." Based upon a plant grown in the Upsala Garden, which from the description in the Hortus Upsalensis 177, 1748, would appear to have been the species now considered.

Open woodland, loam soil, Appalachians, and Piedmont both east and west of the mountains. Ranges from Massachusetts, southern Ontario and eastern Nebraska, south to Florida,⁷ central Alabama and Arkansas.

⁶ Reported from Jackson Co., Alabama, by Mohr, Contrib. Nat. Herb. 6: 718. 1901.

⁷ Reported from Quincy, Florida, by A. W. Chapman in West. Jour. Med. and Surg. 3: 473. 1845; and from the Marianna Red Lands of northern Florida by R. M. Harper, Fla. Geol. Surv. Rep. 6: 199. 1914.

Flowering in July and August, fruiting in August and September. Corolla externally pale-greenish, on posterior side brownish, within purple-brown on posterior side (on and below posterior lobes, and posterior half of antero-lateral lobes), anteriorly (elsewhere) pale-greenish. Sterile filament dark purple-brown.

The northern *Scrophularia leporella* Bickn., easily distinguished by its yellow sterile filament, its more cut leaves and its earlier flowering season (for fuller contrast see Torrey 19: 118), is to be looked for in upland North Carolina⁸ and Tennessee.

The type of *Scrophularia serrulata* Small, Fl. S. E. Un. St. 1058, 1337. 1903, "Type Ga., Chapman, in Herb. C. U.," appears to be a specimen of the Palæarctic *Scrophularia nodosa* L. The plant is from the Chapman herbarium but without indication of collector; certainly some confusing of data has occurred, or perhaps the specimen is from Georgia in the Caucasus.

21. COLLINSIA Nuttall.

Collinsia Nutt., Journ. Acad. Nat. Sci. Phila. 1: 190. 1817.

Type species, *C. verna* Nutt.

1. *Collinsia verna* Nutt.

Collinsia verna Nutt., l. c. 190. pl. 8. 1817. "On descending the Ohio . . . nearly to Galiopolis, . . . I recognized it on the more open alluvions of the river, withered and nearly past affording seed. . . . From these seeds . . . I have been fortunate enough to obtain the plant from which the accompanying drawing was taken by . . . M. C. A. Le Sueur." Type seen in Herb. Academy of Natural Sciences of Philadelphia.

Moist woods, alluvial river-bottoms, in central or western Tennessee. Ranges from western New York to southern Minnesota, south to Tennessee and Missouri.

Flowering in late April and early May, and soon ripening fruit. Not seen growing.

22. RUSSELLIA Jacquin.

Russellia Jacq., Enum. Pl. Carib. 25. 1760.

Type species, *R. sarmentosa* Jacq., of Cuba.

1. *Russellia juncea* Zucc.

Occasional in pineland and hammock, Dade County, southern Florida. Escaped from gardens. Introduced from Mexico.

23. ANGELONIA Humboldt & Bonpland

Angelonia H. & B., Pl. Aequin. 2: 92. pl. 108. 1809.

Type species, *A. salicariaefolia* H. & B., of Venezuela.

⁸ Reported from western North Carolina by Hyams, N. C. Coll. A. & M. Arts, Bull. 164, 326. 1899.

1. *Angelonia angustifolia* Benth.

Occasional in pineland, Dade County, southern Florida. Escaped from gardens. Introduced from Mexico.

24. **LINARIA** Miller.

Linaria Mill., Gard. Dict. ed. IV. 1754.

Type species, *Antirrhinum linaria* L., of Europe.

Corolla, excluding spur, 4–12 mm. long, blue, posterior lip erect; anterior lip broadly spreading, but not forming a definite raised palate. Capsule 2–3.5 mm. long, equaling to exceeding the sepals. Seeds .3–.4 mm. long, cylindric, prismatic-angled, not winged. Stem less leafy, the younger stems spreading-prostrate from base. (*Leptoplectron.*)

Pedicels glandular-pubescent, longer than the corollas. Spur very short. 1. *L. floridana.*

Pedicels nearly glabrous, shorter than the corollas. Spur slender.

Corolla less than 8 mm. long, excluding the spur. Surface of seeds smooth to slightly tuberculate. 2. *L. canadensis.*

Corolla over 10 mm. long, excluding the spur. Surfaces and angles of seed densely tuberculate. 3. *L. texana.*

Corolla, excluding spur, 15–18 mm. long, yellow; posterior lip arched over anterior; anterior lip forming a conspicuous protruding orange palate; spur stout. Capsule 10 mm. long, much exceeding the sepals. Seeds 1.7 mm. long, flattened and circularly broadly winged. Stem densely leafy, always erect.

4. *L. linaria.*

1. *Linaria floridana* Chapm.

Linaria floridana Chapm., Fl. S. Un. St. 290. 1860. "Drifting sands near the coast, West Florida." Several specimens, collected by Dr. Chapman at Apalachicola, seen in Herb. New York Botanical Garden and Academy of Natural Sciences of Philadelphia.

Dry sandy soil, sand ridges along rivers and near the coast, southern Georgia to central Florida, westward near the Gulf Coast to southern Mississippi.

Flowering in March and April, and soon ripening fruit, the late flowering and fruiting plants persisting through May. Corolla light-blue, the palate paler.

Pennell (Florida)—9579, 9581.

2. *Linaria canadensis* (L.) Dum.-Cours.

Antirrhinum canadense L., Sp. Pl. 618. 1753. "Habitat in Virginia, Canada." Type probably from southern New Jersey, and certainly the species now considered. For discussion see Torrey 19: 151. 1919.

Linaria canadensis Dum.-Cours. Bot. Cult. 2: 96. 1802. "Lieu, Le Canada, la Virginie." Doubtless based upon *Antirrhinum canadense* L.

Open sandy soil, usually a weed, mostly common in the Atlantic Coastal Plain south to central Florida (intergrading somewhat with *L. texana* in Georgia and Florida); in the Piedmont on the

Granite of the Carolinas and central Georgia, and on other sandy soils, where probably introduced, inland to the southern Appalachians. Ranges northward to Massachusetts. Westward and inland at occasional stations where probably introduced.

Flowering from March to May, and soon ripening fruit. Corolla purplish-blue, the palate pale to white. Occasionally a pink-flowered form occurs.

Pennell (Georgia)—9502. (Florida)—9533, 9536, 9577, 9701.

3. *Linaria texana* Scheele.

Linaria texana Scheele, *Linnaea* 21: 761. 1848. "Zwischen Houston und Austin [Texas] häufig: Römer." Description sufficiently distinctive.

Open sand or sandy loam, frequently a weed, in the Coastal Plain from South Carolina to southern Mississippi, probably more common westward. Ranges widely through western North America, and into South America. Probably *Linaria canadensis* is a derivative of this.

Flowering from March to May and soon ripening fruit. Corolla pale-blue, reticulate-veined with slightly darker color, essentially as in *L. canadensis* but larger throughout.

Pennell (Georgia)—9512, 9521. (Alabama)—9724, 9727.

4. *Linaria linaria* (L.) Karst.

Linaria vulgaris Mill.

Loam or sandy soil, fields and waste ground, a weed; mostly above the Fall-line, probably common northward. Naturalized from Eurasia.

25. *KICKXIA* Dumortier.

Kickxia Dum., *Fl. Belg.* 35. 1827.

Type species, *Antirrhinum elatine* L., of Europe.

Leaf-blades rounded-cordate at base. Calyx-lobes ovate.

1. *K. spuria*.

Leaf-blades hastate. Calyx-lobes lanceolate.

2. *K. elatine*.

1. *Kickxia spuria* (L.) Dumort.

Waste places and roadsides, occasional eastward. Naturalized from Eurasia.

2. *Kickxia elatine* (L.) Dumort.

Waste places, roadsides and stone-walls, occasional eastward. Naturalized from Eurasia.

26. *VERONICASTRUM* Heister.

Veronicastrum Heist.; Fabr., *Enum. Meth. Pl. Hort. Helmstad.* 111. 1759.

Type species, *Veronica virginica* L.

1. **Veronicastrum virginicum** (L.) Farwell.

Veronica virginica L., Sp. Pl. 9. 1753. "Habitat in Virginia." Grown in the Clifford Garden. Certainly the species here considered.

Veronicastrum album Moench., Meth. 437. 1794. ". . . *Veronica virginica* L."

Calistachya alba Raf., Med. Repos. N. Y. IIInd Hex. 5: 352. 1808. Based on *Veronica virginica* L. Type of *Calistachya* Raf., not *Callistachys* Vent., 1804.

Eustachya alba (Raf.) Raf., Cat. 14. 1824. *Eustachya* Raf., Amer. Mo. Mag. 4: 190. 1819, was a new name for *Calistachya* Raf. Preoccupied by *Eustachys* Desv., 1810.

Leptandra alba (Raf.) Raf., Med. Fl. 2: 21. 1830. "The true *V. virginica* of L. . . . The most common species being found all over the United States."

Leptandra villosa Raf., l. c. 21. 1830. "Mr. Schweinitz has found it in North Carolina." If the state with the leaves pubescent beneath be distinguished as a forma, this name should be used.

Veronicastrum virginicum (L.) Farwell, Drugg. Circ. 61: 231. 1917.

Varying, in number of leaves in whorl, in inflorescence of one or several racemes, and in leaves from lanceolate to nearly ovate, pubescent to nearly or quite glabrous beneath.

Sandy or loam soil, swales or moist meadows, hillside thickets, through the southern Appalachians and Piedmont, both east and west of the mountains, apparently scarce; rarely descending into the Coastal Plain. Ranges from Connecticut and Ontario and Minnesota, south to Mississippi and Texas.

Flowering in August, fruiting in September. Corolla white throughout, anthers brown.

27. **VERONICA** Linné.

Veronica L., Sp. Pl. 9. 1753.

Type species, *V. officinalis* L., of Europe.

Flowers solitary, axillary, frequently approximating so as to form a terminal raceme. Leaves alternate through the inflorescence.

Pedicels longer than the sepals, usually exceeding the bracts.

Sepals ovate. Capsule turgid. Seeds few, 1.3–3 mm. long, convex-arched, roughened. Leaves petioled (rarely the uppermost sessile), primarily palmately 5–7 nerved, the mid-vein usually with some radiating pinnate veins; mainly alternate, the lower sometime opposite.

Leaves broadly cordate, 3–5 lobed, the lobes rounded. Sepals broadly ovate, conspicuously ciliate. Capsule very turgid, scarcely notched at apex, only slightly 2-lobed. Seeds 2.5–3 mm. long, blackish. 1. *V. hederæfolia*.

Leaves ovate, serrate to dentate. Sepals more shortly ciliate.

Capsule slightly flattened, deeply notched at apex, thus strongly two-lobed. Seeds 1.3–1.5 mm. long, brown.

Petals not exceeding the ovate sepals. Capsule-lobes rounded, the most distal point of each about midway between the style and the lateral margin.

2. *V. agrestis*.

Petals exceeding the narrowly ovate sepals. Capsule-lobes acutish, the most distal point of each near the lateral margin.

3. *V. persica*.

Pedicels shorter than sepals or bracts. Sepals linear to narrowly ovate. Capsule flattened. Seeds many, less than 1 mm. long, flat, smooth or nearly so. Leaves sessile (or the lower petioled), scarcely palmate, alternate only through the inflorescence.

Perennial. Repent, with ascending stems. Leaves oval or ovate, obscurely crenate. Inflorescence spike-like, restricted to the distal portion of the stem. Sepals ovate. Corolla white, with blue lines on posterior side. Capsule retuse or shallowly notched, glandular-pubescent.

4. *V. serpyllifolia*.

Annuals. Erect, much branched below. Most leaf-axils flower-bearing. Sepals lanceolate to linear. Capsule deeply notched.

Lower stem-leaves ovate, crenate-serrate, the lowermost frequently petioled. Corolla deep violet-blue. Capsule pubescent with slightly gland-tipped hairs. Plant pubescent with glandless hairs.

5. *V. arvensis*.

Lower stem-leaves oblanceolate, entire or distally remotely toothed, all sessile. Corolla whitish throughout. Capsule glabrous. Plant glabrous or with short gland-tipped hairs.

Plant glabrous.

6. *V. peregrina*.

Plant pubescent with gland-tipped hairs.

6a. *V. peregrina xalapensis*.

Flowers all in axillary small-bracted racemes. Leaves opposite throughout. Perennials.

Capsule glandular-pubescent, strongly two-lobed, longer than the sepals. Stems, pedicels, leaves and sepals pubescent. Leaves oval, crenate-serrate, narrowed to a petiolar base. Extensively repent, at apex ascending. Plant of dry soil.

7. *V. officinalis*.

Capsule glabrous, scarcely or not two-lobed, equaling the sepals. Plant glabrous or with scattered gland-tipped hairs. Leaves oblong-ovate to broadly lanceolate, obscurely crenate-serrate. Ascending or wholly erect. Aquatics.

Stem distally, rachis and pedicels glabrous. Leaves oblong-ovate, all petioled, mostly emersed. Racemes usually 10-25 flowered. Plant emersed.

8. *V. americana*.

Stem distally, rachis and pedicels sparsely pubescent with glands, borne upon jointed stalks. Leaves lanceolate, clasping. Racemes usually 25-50 flowered. Plant nearly submersed.

9. *V. glandifera*.

1. *Veronica hederaefolia* L.

Waste places, mostly near cities, occasional. Naturalized from Eurasia.

2. *Veronica agrestis* L.

Waste places and fields, mostly near cities, occasional. Naturalized from Eurasia.

3. *Veronica persica* Poir.

Fields, roadsides and waste places, occasional or local. Naturalized from Eurasia.

Corolla with tube and base of lobes white, anterior lobes pale, lateral darker, posterior sky blue; lobes all with blue longitudinal veins.

4. *Veronica serpyllifolia* L.

Fields, thickets and waste places, common at least northward. Naturalized from Eurasia.

Corolla white or nearly so, on posterior side with blue lines.

5. *Veronica arvensis* L.

Fields, cultivated soil, and waste ground, common at least northward. Naturalized from Eurasia.

Corolla with all lobes deep sky-blue, whitish at base, veined with deeper sky-blue.

6. *Veronica peregrina* L.

Veronica peregrina L., Sp. Pl. 14. 1753. "Habitat in Europae hortis, arvisque." Described, as the specific name would suggest, from specimens of an introduced plant.

Fields and cultivated soil, especially where moist, common. Certainly American in origin, but now wholly weed-like.

Corolla uniformly dull-white.

Pennell (Florida)—9712. (Alabama)—9725, 9758.

6a. *Veronica peregrina xalapensis* (H.B.K.) Pennell.

Veronica xalapensis H. B. K., Nov. Gen. et Sp. 2: 389. 1817. "Crescit in Regno Mexicano prope Xalapa (alt. 630 hex. [ca. 1200 m.]), in nemoribus Liquidambaris Styracifluae."

Veronica peregrina xalapensis (H. B. K.) Pennell, Torreya 19: 167. 1919.

Occasional in cultivated soil. In the western half of the continent this glandular-pubescent variety quite replaces true *peregrina*. In the East it is only occasionally seen, and that probably as an introduction.

7. *Veronica officinalis* L.

Dry fields, open woods, and stony hillsides, common at least northward. Naturalized from Eurasia.

Corolla very pale-lavender, on posterior side with seven lavender-blue lines.

8. *Veronica americana* Schwein.

Veronica americana Schwein., Benth. in DC. Prod. 10: 468. 1846. "*Veronica americana* (Schweinitz! mss.). . . . In America boreali a

Canada et Carolina usque ad flum. Oregon et in ins. Sitcha
(v. s.)” Specimen seen in Herb. Academy of Natural Sciences of Philadelphia, labeled “Bethl.” [Bethlehem, Pennsylvania], collected by Schweinitz, may be of collection sent Bentham.

Springheads in woodland, and along streams, in the southern Appalachians of North Carolina and eastern Tennessee, in the Piedmont of South Carolina, likely occasional in this zone both east and west of the mountains. Ranges from Quebec to Alaska, south to South Carolina, New Mexico and California.

Flowering from June to August, and soon ripening fruit. Corolla pale-blue, distally with few rather faint deeper-blue lines.

9. *Veronica glandifera* Pennell.

Veronica glandifera Pennell, *Torreyia* 19: 170. 1919. “Type, vicinity of Suffolk, Nansemond County, Virginia, collected in flower and fruit May 27, 1893, N. L. Britton and J. K. Small; in herbarium Columbia University at the New York Botanical Garden.”

Shallow flowing streams, mostly in calcareous soil, Appalachians of North Carolina and eastern Tennessee. Ranges from New Jersey to North Carolina, Minnesota and Kentucky.

Flowering in June and July, and soon ripening fruit. Corolla pale-blue, with few deeper-blue lines.

28. *MACRANTHERA* Torrey.

Macranthera Torr.; Benth., *Comp. Bot. Mag.* 1: 174. 1836.

Type species, *Conradia fuchsoides* Nutt.

1. *Macranthera flammea* (Bartram) Pennell.

Gerardia flammea Bartram, *Trav.* 410. 1791. “Stony gravelly heights [along Tejasaw River near] Taensa” In Alabama. No type known to exist. Identified by Mohr in *Contr. U. S. Nat. Herb.* 6: 15. 1901.

Conradia fuchsoides Nutt., *Journ. Acad. Nat. Sci. Phila.* 7: 88. pl. 12. 1834. No locality given. Type, without data, seen in Herb. Academy of Natural Sciences of Philadelphia. Type of genus *Conradia* Nutt., not *Conradia* Mart., 1829.

Macranthera lecontei Torr., *Ann. Lyc. Nat. Hist. N. Y.* 4: 80. pl. 4. 1837. “In dry pine woods on the Alatomaha, in Liberty County, Georgia, Major Le Conte!” Type, without data, seen in Herb. Columbia University at the New York Botanical Garden.

Dasystema tubulosa Bertol., *Mem. Accad. Sci. Instit. Bologna* 4: 75. pl. 4. 1853. “Ex Alabama, Dr. Gates.” Probable isotypes seen in Herb. New York Botanical Garden, Herb. Academy of Natural Sciences of Philadelphia and Gray Herbarium.

Macranthera flammea (Bartram) Pennell, *Bull. Torr. Bot. Club* 40: 124. 1913.

Borders of wet sandy thickets, in the Coastal Plain, southern Georgia and northern Florida to eastern Louisiana.

Flowering from August to October, fruiting September and October. Corolla orange throughout.

Pennell (Florida)—4564, 4595, 4681. (Alabama)—4406, 4459, 4462, 4534, 4553, 4641.

29. DASISTOMA Rafinesque.

Dasistoma Raf., Journ. de Phys. 89: 99. 1819.

Type species, *D. aurea* Raf., of Kentucky.

1. Dasistoma macrophylla (Nutt.) Raf.

Seymeria macrophylla Nutt., Gen. N. Amer. Pl. 2: 49. 1818. "Hab. In shady alluvial soils of the banks of the Little Miami, near the town of Lebanon." In Ohio. Specimen in Kew Herbarium labeled "Ohio Nuttall misit Mart. 1824," may stand as the type; this seen.

Dasistoma macrophylla (Nutt.) Raf., New Fl. Amer. 2: 67. 1837.

Brachygyne macrophylla (Nutt.) Small, Fl. S. E. Un. St. 1073, 1338. 1903.
Type of genus, *Brachygyne* Small.

Sandy to clay soil, mostly in rich woods, usually along streams, western North Carolina,⁹ central Tennessee and northern Alabama. Ranges from Ohio to eastern Nebraska, south to northern Alabama and northeastern Texas.

Flowering in July and August, fruiting August and September. Corolla yellow, externally tinged or marked with purple-red.

30. AFZELIA J. F. Gmelin.

Afzelia J. F. Gmel., Syst. 927. 1791.

Type species, *Anonymos cassioides* Walt.

Stem closely pubescent, viscid. Leaf-segments lanceolate or broader. Calyx-lobes lanceolate. Corolla deep-yellow, externally pubescent, its lobes ovate, 3-3.5 mm. wide. Distal portion of filament and connective of anther lanose. Anther-sacs opening one-fifth to one-fourth length. Capsule ovate, 6-7 mm. long, densely tomentose with short brown more or less glandular hairs. Seeds winged. Plant low, 2-6 dm. tall, widely branched. Stem lanose to pubescent with reflexed-incurved to -appressed hairs. Pedicels 6-7 mm. long. Capsule densely glandular-tomentose, with hairs dark-jointed, some of them glandular-knobbed at tip. Seeds 1-1.2 mm. long.

1. *A. pectinata*.

Stem finely pubescent to puberulent in lines with ascending-incurved to -appressed hairs. Pedicels 7-10 mm. long. Capsule less tomentose to nearly glabrous, with hairs slightly dark-jointed, most or all of them glandular-knobbed at tip. Seeds 1.2-1.4 mm. long. 1a. *A. pectinata peninsularis*.

Stem sparingly pubescent, with ascending-incurved hairs, scarcely glandular. Leaf-segments filiform. Calyx-lobes linear. Corolla pale-yellow, externally glabrous, its lobes lanceolate, 1.5-2 mm. wide. Distal portion of filament and connective of anther glabrous. Anther-sacs opening one-sixth to one-fifth length. Capsule urceolate-acuminate, 4-4.5 mm. long, glabrous. Seeds not winged, .5-.7 mm. long. Plant 5-10 dm. tall, virgately branched.

2. *A. cassioides*.

⁹ Reported from western North Carolina by Hyams, N. C. Coll. A. & M. Arts, Bull. 164: 327. 1899.

1. *Afzelia pectinata* (Pursh) Kuntze.

Seymeria pectinata Pursh, Fl. Amer. Sept. 2: 737. 1814. "In South Carolina. Catesby. v. s. in Herb. Sherard." Type not seen, but description distinctive.

Seymeria jacksoni Ell., Sketch Bot. S. C. and Ga. 2: 123. 1824. "Sent to me from Louisville, Ga., by Mr. Jackson." Type seen in the Elliott Herbarium at the Charleston Museum.

Seymeria heterophylla Raf., New Fl. Amer. 2: 68. 1837. "Alabama and Georgia, my specimen from Le Conte." Type not known to exist.

Afzelia pectinata (Pursh) Kuntze, Rev. Gen. 1: 457. 1891.

Dry sandy longleaf pineland, in the Coastal Plain from South Carolina¹⁰ to Louisiana, south in the Florida peninsula to Brevard County; inland reported from the Pine Mountains of Meriwether County, Georgia,¹¹ and from the metamorphic region of northeastern Alabama.¹²

Flowering in August and September, fruiting September and October. Corolla deep golden-yellow, more or less marked with purple-red within throat and at the bases of the lobes.

Pennell (Georgia)—4732, 4760, 4780, 4845. (Florida)—4568, 4585, 4645, 4656, 4674, 4686, 4705, 4715, 4802. (Alabama)—4630.

1a. *Afzelia pectinata peninsularis* Pennell, var. nov.

Stem 4–6 dm. tall, finely glandular-pubescent to -puberulent in lines with ascending incurved to -appressed hairs. Leaves glandular-pubescent to -puberulent, those of the stem 1–2 cm. long, 5–8 mm. wide. Pedicels in flower 5 mm. long, in fruit 7–10 mm. long. Calyx-lobes 4.5 mm. long. Corolla 8 mm. long, its tube 3–3.5 mm. long, its lobes 4.5 mm. long. Style 4–5 mm. long. Capsule minutely glandular-pubescent with hairs slightly dark-jointed, most or all with terminal knob-like glands. Seeds 1.2–1.4 mm. long.

Type, flat woods, Marco, Lee Co., Florida, collected in fruit July–August, 1900, A. S. Hitchcock 254, in United States National Herbarium.

Flat long-leaf pineland or hammocks, southern Florida.

Flowering June to August, probably flowering and fruiting throughout the year.

2. *Afzelia cassioides* (Walt.) J. F. Gmel.

Anonymos cassioides Walt., Fl. Carol. 171. 1788. Presumably from lower South Carolina. Description sufficiently distinctive.

Afzelia cassioides (Walt.) J. F. Gmel., Syst. 927. 1791.

Gerardia afzelia Michx., Fl. Bor. Amer. 2: 20. 1803. New name for *Afzelia cassioides* (Walt.) Gmel.

Seymeria tenuifolia Pursh, Fl. Amer. Sept. 737. 1814. New name for *Gerardia cassioides* (Walt.) Pers.

¹⁰ Reported from lower North Carolina, collected by Croom [see M. A. Curtis, Bot. N. C. 39. 1867].

¹¹ Harper, Bull. Torr. Bot. Club 36: 587. 1909.

¹² Earle, Ala. Agric. Exp. Sta., Bull. 119: 104. 1902.

Moist or dry pineland, usually in sandy soil, in the Coastal Plain from North Carolina to Florida and Louisiana, in the Florida peninsula south to Manatee County; inland to the mountains of northern Georgia, northern Alabama and eastern Tennessee; also on the Bahamas.

Flowering from September to mid-October, and soon ripening fruit. Corolla pale-yellow, more or less marked with purple-red within throat and at the bases of the lobes.

Pennell (North Carolina)—4900, 4919. (South Carolina)—4866, 4872, 4878. (Georgia)—4725, 4743, 4762, 4809, 10173. (Florida)—4588, 4649, 4653, 4678, 4691, 4713, 4719, 9647. (Alabama)—4552, 4639. (Louisiana)—4217.

31. AUREOLARIA Rafinesque.

Aureolaria Raf., New Fl. Amer. 2: 58. 1837.

Type species, *Aureolaria villosa* Raf.

Annuals. Stem, leaves and calyx glandular. Leaves bipinnatifid, more or less pectinately cut. Calyx-lobes dentate to pectinate. Corolla externally glandular-pubescent, within pubescent below posterior sinus and over bases of posterior lobes; more or less marked or tinged with purple-red. Anther-sacs 2.5–4 mm. long. Capsule ellipsoid to broadly-ovoid in outline, glandular-puberulent to -pubescent. Seeds .8–1 mm. long, not winged.

(*Panctenis* Raf.)

Leaves less sharply cut, with mostly rounded teeth, puberulent to somewhat glandular-pubescent. Pedicels 10–28 mm. long. Calyx-tube turbinate, glandular-puberulent externally. Capsule narrowly to broadly ellipsoid, 9–15 mm. long, one-half to two-thirds enclosed in the calyx-tube. Seeds .8 mm. long.

Stem closely pubescent above, not or slightly glandular. Leaves puberulent, not or slightly glandular. Calyx-lobes 8–10 mm. long. Capsule narrowly ellipsoid, 9–11 mm. long.

Leaves 3–6 cm. long, more strongly cut, incisions extending mostly about two-thirds distance to midrib, not or scarcely glandular. Pedicels permanently more or less glandular-pubescent. Calyx-tube 4–5 mm. long. Stem closely pubescent, not or scarcely glandular above.

1. *A. pedicularia*.

Leaves 2–3.5 cm. long, less cut, incisions extending mostly about one-half distance to midrib, slightly glandular. Pedicels tending to become nearly glabrous. Calyx-tube 5–7 mm. long. Stem from nearly glabrous to slightly glandular. 1a. *A. pedicularia carolinensis*.

Stem glandular-pubescent to hirsute above. Leaves glandular-puberulent to -pubescent. Calyx-lobes 10–16 mm. long,

relatively deeply lobed. Capsule broadly ellipsoid, 11-14 mm. long.

1b. *A. pedicularia austromontana*.

Leaves more sharply cut, with acute or acutish teeth, glandular-pubescent to -villose. Pedicels 4-20 mm. long. Calyx-tube hemispheric, glandular-hirsute to -lanose. Capsule broadly ovoid, 11-16 mm. long, only its base enclosed in the calyx-tube. Seeds 1 mm. long.

Stem stiffly branched. Leaves all spreading, the upper smaller but not excessively reduced, those of the stem 2-6 cm. long. Pedicels 4-20 mm. long, conspicuous when in flower. Calyx-tube glandular-hirsute to -lanose. Corolla 30-40 mm. long. Anther-sacs ovate.

2. *A. pectinata*.

Stem virgately branched. Leaves, at least the upper, appressed-ascending, uppermost leaves very much reduced, those of the stem 1.5-3 (-4) cm. long. Pedicels 4-9 mm. long, usually very short when in flower. Calyx-tube glandular-lanose. Corolla 38-45 mm. long. Anther-sacs lanceolate-ovate

2a. *A. pectinata floridana*.

Perennials. Not glandular. Leaves entire to somewhat coarsely bipinnatifid, not pectinately cut. Calyx-lobes entire to dentate. Corolla externally glabrous, within glabrous or diffused-pubescent; not marked nor tinged with purple-red. Anther-sacs 4-6 mm. long. Capsule ovate to globose-ovate in outline, not glandular. Seeds 1.3-2.7 mm. long, strongly winged.

(*Aureolaria*, sensu strictu.)

Capsule densely rusty-pubescent. Pedicels 1.5-3 mm. long.

Stem puberulent to pubescent, at least above.

Stem puberulent to pubescent throughout. Leaves permanently downy-pubescent. Capsule 12-15 mm. long. Seeds 1.5-1.8 mm. long

3. *A. virginica*.

Stem glabrous below, more or less puberulent above. Leaves puberulent becoming glabrous. Capsule 9-12 mm. long. Seeds 1.3-1.5 mm. long.

4. *A. microcarpa*.

Capsule glabrous. Pedicels 3-25 mm. long. Stem glabrous to minutely puberulent.

Bracts entire to finely crenate-serrate. Pedicels slender, 15-25 mm. long.

5. *A. patula*.

Bracts entire to coarsely dentate. Pedicels stouter, 3-15 mm. long.

Lower leaves ovate-lanceolate in general outline, widest about the middle, not long-acuminate. Petioles evident, mostly 10-30 mm. long. Pedicels 5-15 mm. long. Calyx densely pubescent within. Corolla 35-60 mm. long. Capsule 12-24 mm. long. Seeds 2-2.7 mm. long. Stem relatively stout, frequently purple.

Stem finely puberulent, not glaucous. Pedicels and calyx externally puberulent. Anther-sacs ovate.

6. *A. dispersa*.

Stem glabrous, glaucous. Pedicels and calyx externally glabrous. Anther-sacs ovate-lanceolate.

Stem slightly glaucous. Lower leaves from nearly entire to more or less dentate or cut, rarely $\frac{1}{2}$ distance to midrib.

7a. *A. flava reticulata*.

Stem quite glaucous. Lower leaves more or less pinnately cut, lowermost somewhat bipinnatifid, mostly over $\frac{1}{2}$ distance to midrib.

7. *A. flava*.

Lower leaves lanceolate to ovate-lanceolate, widest below the middle, long-acuminate. Petioles very short, less than 10 mm. long. Pedicels 3–8 mm. long. Calyx sparingly pubescent to glabrous within. Corolla 30–35 mm. long. Capsule 10–12 mm. long. Seeds 1.5–1.7 mm. long. Stem slender, rarely purplish, not puberulent nor glaucous.

8 *A. laevigata*.

1. *Aureolaria pedicularia* (L.) Raf.

Gerardia pedicularia L., Sp. Pl. 611. 1753. "Habitat in Virginia, Canada." Type not verified, but description sufficiently distinctive.

Aureolaria pedicularia Raf., New Fl. Amer. 2: 61. 1837.

Dry oak-woods, sandy or rocky, perhaps in the Piedmont of North Carolina.¹³ Ranges from Maine to Virginia (and Minnesota).

Flowering in August and September, fruiting September and October. Corolla yellow, externally more or less tinged with reddish, within at times with some purple-red spotting.

1a. *Aureolaria pedicularia carolinensis* Pennell.

Aureolaria pedicularia carolinensis Pennell, Bull. Torr. Bot. Club 40: 413. 1913. "Type, savannahs near Mill Pond, Wilmington, North Carolina, June 23, 1909, J. M. Macfarlane in Herb. University of Pennsylvania."

Dry sandy oak and mixed woods, pine-barrens of southeastern North Carolina.

Pennell (North Carolina)—4925.

1b. *Aureolaria pedicularia austromontana* Pennell, var. nov.

Stem glandular-pubescent to -hirsute above, with spreading short hairs, and among these, usually outnumbering them and exceeding them in length, gland-tipped hairs, so that stem is very glandular. Leaf-blades tending to lanceolate ovate, mostly deeply and sharply cut, finely puberulent with gland tipped hairs, more rarely evidently glandular-pubescent. Pedicels in flower 10–20 mm. long, in fruit (12–)18–25 mm. long. Calyx relatively sparingly pubescent with gland-tipped hairs, its lobes 10–16 mm. long, linear-lanceolate to lanceolate, relatively deeply lobed. Capsule 11–14 mm. long, broadly ellipsoid.

¹³*Aureolaria pedicularia caesariensis* Pennell, Bull. Torr. Bot. Club 40: 413, 1913, with leaves 1.2–5 cm. long, pedicels longer than bracts and stem not glandular hirsute below, has been found in woodland in Orange Co., N. C.

Type, Biltmore, North Carolina, collected in flower August 27, 1897, Biltmore Herbarium 481; in United States National Herbarium.

Dry oak or mixed woodland, on mountain-slopes, eastern and western Appalachians, from southwestern Virginia and southeastern Kentucky to northern Georgia.

This differs from *Aureolaria pedicularia ambigens* (Fernald) Farwell of the southern Lake region in its leaves narrower, more deeply and sharply cut, and its calyx-lobes longer and more deeply lobed.

Pennell (Tennessee)—5725.

2. *Aureolaria pectinata* (Nutt.) Pennell.

Gerardia pedicularia pectinata Nutt., Gen. Pl. N. Amer. 2: 46. 1818. "Hab. In the sandy pine forests of Carolina and Georgia." Specimen of Nuttall's collecting in the British Museum, labeled "*Gerardia millefolia* S. Carol.?" may represent the type. It is determined by Dr. S. Moore as the form now considered, agreeing with my number 5638 from Louisiana.

Aureolaria pectinata (Nutt.) Pennell, Bull. Torr. Bot. Club 40: 414. 1913.

Dry sandy pine and oak lands, especially hilly, through the Coastal Plain from South Carolina to northwestern Florida and Louisiana; extending inland on sandy soils (as the granite of central Georgia), to westernmost North Carolina and eastern Tennessee, and through the Mississippi Valley westward in our area. Ranges northward to Kentucky and southern Missouri. The inland forms have larger leaves and fruit, and probably represent several geographic varieties, an enumeration of which will be given in the writer's "Agalinis and Allies in North America."

Flowering from July to October, fruiting in September and October. Corolla yellow, externally more or less tinged with reddish, within not marked with purple-red.

Pennell (Georgia)—4066, 5694, 5695, 5700, 5708, 5713. (Alabama)—4532, 4625, 5689. (Tennessee)—5707, 5716.

2b. *Aureolaria pectinata floridana* Pennell.

Aureolaria pectinata floridana Pennell, Bull. Torr. Bot. Club 40: 414. 1913. "Type, Fort Gadsden, Franklin Co., Florida, Sept. 20, 1912, F. W. Pennell 4683, in Herb. University of Pennsylvania."

Dry sandy pineland, through the flatwoods of southern Georgia to central Florida.

Pennell (Georgia)—4724. (Florida)—4683.

3. *Aureolaria virginica* (L.) Pennell.

Rhinanthus virginicus L., Sp. Pl. 603. 1753. "Habitat in Virginia." Type, Clayton 488, is identified by Dr. S. F. Blake, in *Rhodora* 20: 66. 1918, as the plant here considered.

Aureolaria villosa Raf., New Fl. Amer. 2: 59. 1837. No type locality stated, nor type known to exist. Description sufficiently distinctive.

Dasystema pubescens Benth., in DC. Prod. 10: 520. 1846. "In Americae sept. civitatibus orientalibus frequens." Type not verified, but description sufficiently distinctive.

Dasystema brachycarpa Small, Bull. Torr. Bot. Club 28: 452. 1901. "The specimens on which this species is based were collected by the writer on the slopes of Stone Mountain, Georgia, Sept. 6-12, 1894." Type seen in Herb. New York Botanical Garden. Also collected by myself at Stone Mountain, Pennell 4050, 5692. The short capsules of this plant are quite within the normal range of variation of *Aureolaria virginica*.

Aureolaria virginica (L.) Pennell, Bull. Torr. Bot. Club 40: 409. 1913.

Dry open woods, usually sandy, frequent through the Piedmont and eastern Appalachians south to central Georgia, less common through the western Appalachians and Mississippi Valley of our area; occasional in the Coastal Plain south to northern Florida and west to Louisiana. Ranges from New Hampshire, south to Florida and Louisiana. This species has been long known as "*Gerardia flava*."

Flowering from late May to July, fruiting from July to September. Corolla yellow, with no tinge of purple-red.

Pennell (Georgia)—4050, 4070, 4090, 5691, 5692, 5697, 5702. (Tennessee)—5724.

4. *Aureolaria microcarpa* Pennell, sp. nov.

Perennial. Stem 6-10 dm. tall, simple or with stiff ascending branches above, below glabrous, above less or more densely puberulent with recurved-spreading dark-jointed hairs. Petioles more or less defined from the narrowed base of the leaves. Lower leaves lanceolate-ovate, somewhat deeply and coarsely sinuate-lobed or merely shallowly dentate, 6-11 cm. long, 15-40 mm. wide; upper leaves gradually smaller and simpler, bracts ovate-lanceolate; leaves above scabrous-puberulent, beneath softly puberulent, becoming nearly or quite glabrous, above dull-green, beneath paler. Pedicels stout, closely pubescent, in flower 1-2 mm. long, in fruit 2-3 mm. long. Calyx externally closely puberulent, its tube 3-5 mm. long, turbinate, within puberulent, its lobes 3.5-7 mm. long, lanceolate to spatulate-ovate, acute to acutish. Corolla 30-40 mm. long, its tube inflated ventrally, its lobes 5-10 mm. long, ovate-orbicular, rounded; externally glabrous, within sparingly pubescent proximally, but glabrous below sinuses of lobes; yellow, with no tinge of purple-red. Filaments slender, flattened, posterior 13-17 mm. long, anterior 18-23 mm. long, all loosely lanose near base and again distally, especially close to the apex; anther-sacs 4-4.5 mm. long, ovate, broadly narrowed at apex into a rigid downcurved awn .8-.9 mm. long; sacs lanose-pubescent with retrorse white hairs. Style 25-30 mm. long. Capsule 9-12 mm. long, ovate to globose-ovate in out-

line, acute to acuminate, brownish, densely rusty-pubescent with reflexed-appressed brown hairs. Seeds 1.3–1.5 mm. long, broadly angular-lunate, flattened; testa gray, with reticulations dark, produced on outer side into several thin wings $\frac{1}{3}$ – $\frac{1}{4}$ diameter of seed.

Type, Stevenson, Jackson Co., Alabama, collected in fruit October 17, 1913, F. W. Pennell 5720, in Herb. University of Pennsylvania.

Dry oak-woods, on siliceous soil, southeastern Tennessee to southern Alabama and northwestern Florida, especially in the southern Cumberland Mountains.

Flowering from early June to late August, fruiting August to October.

Pennell (Georgia)—5711. (Alabama)—5720, 9739, 9742. (Tennessee)—5703, 5706, 5715.

5. *Aureolaria patula* (Chapm.) Pennell, comb. nov.

Dasystema patula Chapm. Bot. Gaz. 3: 10. 1878. "Valley of the Coosa River, near Rome, Georgia." Several collections of Chapman's seen, one labeled "Banks of Horse-leg Creek, a tributary of the Coosa River," in Herb. New York Botanical Garden, may stand as the type.

Wooded bluffs along rivers, central and eastern Tennessee, and northwestern Georgia.

Flowering from August to October. Corolla yellow, with no tinge of purple-red.

Pennell (Tennessee)—5722.

6. *Aureolaria dispersa* (Small) Pennell.

Dasystema dispersa Small, Bull. Torr. Bot. Club 28: 452. 1901. "Louisiana: Feliciana, Carpenter; type in the herbarium of Columbia University." Type seen in Herb. Columbia University at the New York Botanical Garden.

Aureolaria dispersa (Small) Pennell, Bull. Torr. Bot. Club 40: 411. 1913.

Sandy thickets and oak-land, pineland from southern Alabama to Louisiana.

Flowering in August and September, fruiting in October.

Pennell (Alabama)—4504, 4521. (Mississippi)—4384. (Louisiana)—4117, 4245.

7. *Aureolaria flava* (L.) Farwell.

Gerardia flava L., Sp. Pl. 610. 1753. "Habitat in Virginia, Canada." Specimen in Linnean Herbarium identified by Bentham; see in Comp. Bot. Mag. 1: 198. 1836.

Gerardia quercifolia Pursh, Fl. Amer. Sept. 2: 423. pl. 19. 1814. "On the banks of rivers in rich shady places: Pennsylvania to Carolina." Type not verified, but description sufficiently distinctive.

Aureolaria flava (L.) Farwell, Rep. Mich. Acad. Sci. 20: 188. 1918.

Oak woodland, usually on rocky hillsides, loam or sometimes sandy soil, nearly throughout above the Fall-Line, common in the

southern Appalachians; scarcely entering the southern Coastal Plain, where it passes into the following variety. In the southwestern Appalachians and westward, largely replaced by several ill-defined varieties, to be characterized in the writer's monograph of this group. This species has been known as "*Gerardia virginica*" and "*Dasystema virginica*."

Flowering from mid-July to mid-September, fruiting late August to October. Corolla yellow, with no tinge of purple-red.

Pennell (Georgia)—4109, 5693, 5712. (Alabama)—5688, 9728, 9750. (Tennessee)—5704, 5718.

7a. *Aureolaria flava reticulata* (Raf.) Pennell, comb. nov.

Aureolaria reticulata Raf., New Fl. Amer. 2: 59. 1837. "Florida and Alabama." No type known to exist.

Dasystema bignoniiflora Small, Bull. N. Y. Bot. Gard. 1: 285. 1899. "Collected by Dr. Burrows, at Tampa Bay, Florida, in 1834." Type seen in Herb. Columbia University at the New York Botanical Garden.

Sandy ravines and moist woodland, in the Coastal Plain from Maryland to central Florida. Replaces the species in the southern Coastal Plain.

Flowering from late-August to mid-October, fruiting in September and October.

Pennell (South Carolina)—4875. (Georgia)—4723, 4765. (Florida)—4565, 4566, 4696, 4698, 4720, 9703.

8. *Aureolaria laevigata* (Raf.) Raf.

Gerardia levigata Raf., Ann. Nat. 13. 1820. "It grows on the knob hills of Kentucky, the Cumberland mountains and the Alleghany." Specimen in Herb. Columbia University at the New York Botanical Garden labeled in Rafinesque's handwriting "*Gerardia*—n. sp.—Kentucky," may be the type. Description sufficiently distinctive.

Aureolaria levigata (Raf.) Raf., New Fl. Amer. 2: 59. 1837.

Rocky oak-woods, along streams or on mountain-sides, frequent or common through the Appalachians south to northwestern South Carolina and eastern Tennessee. Ranges northward to Pennsylvania.

Flowering from late July to early September, fruiting in September and October. Corolla yellow, with no tinge of purple-red.

Pennell (Tennessee)—5721, 5726, 9791.

32. *AGALINIS* Rafinesque.

Agalinis Raf., New Fl. Amer. 2: 61. 1837.

Type species, *A. palustris* Raf.

Perennial, from a running rootstock. Pedicels erect. Corolla slightly fleshy, pink with darker spots, but with no yellow lines within throat. (*Linifoliae*.)

1. *A. linifolia*.

Annuals, fibrous-rooted. Pedicels ascending or spreading. Corolla membranous, rose-pink, mostly with darker spots and two yellow lines within throat on the anterior side.

Corolla with lobes all spreading, pubescent within at base of posterior lobes, externally more or less pubescent.

Seeds dark-brown. Plants tending to blacken in drying. Calyx-tube not decidedly reticulate-venose. (*Purpureæ.*)

Leaves uniform, linear to filiform-linear.

Inflorescence of elongated normal racemes; pedicels less than 12 mm. long. Seed-coat with dark-brown ridges, between which mostly paler and minutely reticulate.

Leaves and calyx-lobes obtuse to acutish. Anther-sacs obtuse to acutish at distal apex. Plant fleshy, bushy-branched below with elongated racemes above. Pedicels 5–12 mm. long. 2. *A. spiciflora.*

Leaves and calyx-lobes acute to acuminate. Anther-sacs mucronate to caudate at distal apex. Plants not fleshy, more uniformly branched. Pedicels .5–5(–8) mm. long.

Corolla rose-pink to pink, two yellow lines and almost always darker spots within throat evident. Capsule 4–7 mm. long. Plants dull-green or purplish.

Stem smooth or minutely scabrelous. Axillary fascicles not or slightly developed, if present shorter than the leaves. Seeds .6–1.5 mm. long.

Corolla 20–38 mm. long, deeper rose-pink.

Axillary fascicles slightly developed. Pedicels 3–8 mm. long. Seeds .9–1.5 mm. long; areas between reticulations mostly paler, and intrareticular lines discernible.

Stem relatively stiffly branched, sparingly scabrelous. Calyx-lobes triangular-lanceolate to -subulate. Corolla 20–38 mm. long. 3. *A. purpurea.*

Stem slender, virgately branched, glabrous. Calyx-lobes triangular-subulate to subulate. Corolla 20–25 mm. long.

4. *A. virgata.*

Axillary fascicles scarcely or not developed. Pedicels 2–3 mm. long. Seeds .9–1 mm. long; areas between reticulations nearly black, and no intrareticular lines discernible.

5. *A. pinetorum.*

Corolla 15–18 mm. long, paler rose-pink. Flowers nearly sessile, on pedicels less than 2 mm. long.

6. *A. harperi.*

Stem more or less scabrous. Axillary fascicles usually abundantly developed, mostly equaling the leaves. Seeds .5–.8 mm. long.

7. *A. fasciculata.*

Corolla lavender-pink, no yellow lines nor darker spots evident within throat. Capsule 3.5–5 mm. long. Plant bright-green, little darkening in drying. Stem smooth or nearly so. Axillary fascicles abundantly developed.

8. *A. georgiana*.

Inflorescence usually of short or much broken racemes (if elongated and normal, pedicels over 10 mm. long), usually some flowers by slower or arrested growth of stem-apex appearing terminal. Pedicels 5–50 mm. long.

Stem scabrous. Corolla pubescent within in narrow line below sinus of posterior lobes. Anther-sacs strongly mucronate-caudate at distal apex, densely lanose with pink hairs on the sides. Seed-coat with dark-brown reticulations, areas between these more or less hexagonal, pale and not reticulated. Stem-leaves opposite, axillary fascicles abundantly developed. Pedicels 25–40 mm. long. Corolla 25–30 mm. long.

9. *A. pulchella*.

Stem glabrous or essentially so. Corolla pubescent within over entire width of basal portions of posterior lobes. Anther-sacs acute to minutely mucronate-caudate at distal apex, glabrous over much of dorsal surface. Seed-coat with dark-brown reticulations, areas between these elongated, scarcely paler, and scarcely or not reticulated.

Stem-leaves alternate, widening distally, slightly fleshy. Axillary fascicles abundantly developed. Stigma 3.5–5.5 mm. long. Pedicels 20–35 mm. long. Corolla 22–28 mm. long.

10. *A. filifolia*.

Stem-leaves all opposite, not widening distally, not fleshy. Axillary fascicles not or scarcely developed. Stigma 1–2 mm. long.

Branches very widely and laxly ascending. Pedicels 25–50 mm. long, very slender, four or five times as long as the bracts. Corolla 15–18 mm. long, paler rose-pink. Seeds .3–.5 mm. long.

11. *A. laxa*.

Branches more closely and stiffly ascending. Pedicels 4–40 mm. long, less than twice as long as the bracts. Corolla 15–30 mm. long, deeper rose-pink. Seeds .5–.9 mm. long.

Leaves 2–3.5 cm. long, equaling or exceeding the internodes, slightly scabrous to glabrous above.

Pedicels 15–40 mm. long, longer than the bracts. Calyx-tube $\frac{2}{3}$ – $\frac{1}{2}$ the length of the capsule.

Corolla mostly 17–25 mm. long. Capsule 3–4 mm. long. Seeds .5–.6 mm. long. Leaves sparingly scabrous to glabrous above.

Leaves narrowly linear to filiform, .3–1.5 mm. wide. Racemes mostly somewhat developed, so flowers not conspicuously “terminal.” Pedicels 15–40 mm. long. Calyx-lobes .2–.5 mm. long. Corolla 18–25 mm. long. Seeds rounded, turgid, with reticulations very fine, relatively close.

12. *A. holmiana*.

Leaves filiform-setaceous, .1–.3 mm. wide. Racemes scarcely developed, so flowers conspicuously “terminal.” Pedicels 15–20 mm. long. Calyx-lobes .1–.3 mm. long. Corolla 17–20 mm. long. Seeds angled, with reticulations less fine and more remote.

13. *A. stenophylla*.

Pedicels 5–10 (–15) mm. long, shorter than or equaling the bracts. Calyx-tube $\frac{3}{4}$ – $\frac{2}{3}$ the length of the capsule. Corolla mostly 25–30 mm. long. Capsule 4–5 mm. long. Seeds .6–.8 mm. long. Leaves slightly scabrous above. Flowers conspicuously “terminal.”

14. *A. setacea*.

Leaves .5–1.2 cm. long, shorter than the internodes, scabrous above. Corolla 15–22 mm. long.

Stem slightly striate-four-angled, sparingly scabrous to glabrous. Leaves filiform, .8–1.2 cm. long. Pedicels 4–6 mm. long, about equaling the bracts. Calyx-lobes not becoming callose.

15. *A. keyensis*.

Stem nearly terete, striate-ridged, minutely hispidulo-roughened on the ridges. Leaves linear-subulate, .5–1 cm. long. Pedicels 4–15 mm. long, three to six times the length of the bracts. Calyx-lobes becoming more or less callose.

16. *A. oligophylla*.

Leaves dimorphic, those near the base of the stem oval ovate, spreading, the cauline minute, scale-like, appressed. Pedicels 1.5–3 mm. long (many flowers appearing to terminate minute axillary branchlets). Calyx-lobes minute, subulate, callose. Corolla 15–20 mm. long. Stem striate-four-angled, ridged, minutely hispidulo-roughened on the ridges, often pubescent at base.

17. *A. aphylla*.

Seeds yellowish-brown. Plants not tending to blacken in drying. Calyx-tube evidently reticulate-venose. (*Erectæ*.)

Stem evidently striate-four-angled, simple to moderately branched. Leaves linear to nearly filiform, 1–2.5 cm. long. Racemes well-developed, so flowers not conspicuously “terminal.” Stigma 1–2 mm. long.

Leaves linear to nearly filiform, not widening distally, acutish to acuminate. Corolla with two yellow lines and purple-red spots within throat strongly defined. Capsule globose to globose-ovoid, somewhat flattened at base.

Leaves 2–2.5 cm. long, filiform-linear, relatively scabrous above. Pedicels one to three times the length of the bracts. Corolla 13–15 mm. long. Seeds .6–.8 mm. long.

18. *A. decemloba*.

Leaves 1–1.5 (–2) cm. long, linear-filiform to nearly filiform, slightly scabrous above. Pedicels mostly three to eight times the length of the bracts. Corolla 15–20 mm. long. Seeds .9–1.1 mm. long.

19. *A. tenella*.

Leaves linear, widening distally, acutish to obtuse, 1–1.5 (–1.8) cm. long. Corolla with lines and spots within throat faint or obsolete. Capsule globose-ovoid to globose-elliptic, rounded at base. Corolla 12–16 mm. long.

20. *A. erecta*.

Stem nearly terete, much branched. Leaves narrowly linear, 2–3 cm. long. Racemes scarcely developed, so flowers scattered and conspicuously “terminal.” Stigma 2–3 mm. long. Corolla 12–18 mm. long.

21. *A. gattingeri*.

Corolla with posterior lobes arched over stamens and style, glabrous within at their base. (*Tenuifoliæ*.)

Corolla pubescent externally, its posterior lobes about two-thirds the length of the anterior, minutely ciliate, concave-arched. Pedicels, if exceeding the bracts, less than twice their length. Corolla 10–23 mm. long, rose-pink. Leaves linear.

Corolla 15–23 mm. long.

22a. *A. tenuifolia leucanthera*.

Corolla 10–15 mm. long.

Leaves linear, 1–6 mm. wide, those of the stem obviously wider than those of the branches.

Calyx-lobes mostly 1–2 mm. long. Capsule mostly 5–7 mm. long. Seeds .7–1.3 mm. long, with reticulations more pronounced. Leaves 1–6 mm. wide.

22b. *A. tenuifolia macrophylla*.

Calyx-lobes mostly less than 1 mm. long. Capsule mostly 3–4 mm. long. Seeds .6–.9 mm. long, with reticulations very fine. Leaves 1–3.5 mm. wide.

22. *A. tenuifolia*.

Leaves linear-filiform to filiform, .3–1 mm. wide, those of the stem scarcely wider than those of the branches.

22c. *A. tenuifolia polyphylla*.

Corolla glabrous externally, its posterior lobes less than one-half the length of the anterior, conspicuously ciliate, flattened. Pedicels at least three times the length of the bracts.

Leaves filiform, those of the stem 1.5–2 cm. long. Racemes well-developed, so flowers not appearing "terminal." Pedicels 20–32 mm. long, three to twelve times the length of the bracts. Corolla 15–18 mm. long, rose-pink. Plant widely much branched.

23. *A. divaricata*.

Leaves minute, triangular-subulate, .1–.2 cm. long. Flowers scattered, mostly appearing "terminal." Pedicels 6–10 mm. long, many times the length of the bracts. Corolla 10–13 mm. long, lavender-pink. Plant sparingly very laxly branched.

24. *A. filicaulis*.

1. *Agalinis linifolia* (Nutt.) Britton.

Gerardia linifolia Nutt., Gen. Pl. N. Amer. 2: 47. 1818. "Hab. From Wilmington, North Carolina, to Florida." Type, labeled "Carolina," and collected by T. Nuttall, seen in Herb. Academy of Natural Sciences of Philadelphia.

Agalinis perennis Raf., New Fl. Amer. 2: 63. 1837. "My specimen is from Florida." Type not known to exist, but description quite distinctive.

Agalinis linifolia (Nutt.) Britton; Britton & Brown, Ill. Fl. ed. II. 3: 209. 1913.

Wet sandy pineland, usually about margins of ponds in long-leaf pineland, in the Coastal Plain from North Carolina to southern Florida and west to Louisiana. Northward occurs in southern Delaware.

Flowering from mid-August to October, fruiting September to November. Corolla pink, with no yellow lines but with diffused purple-red spots within throat anteriorly.

Pennell (Georgia)—4729, 4745, 4790, 4823. (Florida)—4600, 4648, 4654, 4666, 4690, 4714, 4794, 4807, 4813.

2. *Agalinis spiciflora* (Engelm.) Pennell, comb. nov.

Gerardia maritima grandiflora Benth., Comp. Bot. Mag. 1: 208. 1836. "Texas, Drummond, (1st Coll.);" Type in Kew Herbarium verified by Dr. N. E. Brown as agreeing with my number 4702 from Florida; isotype seen in Herb. Columbia University at the New York Botanical Garden.

Gerardia spiciflora Engelm., Bost. Journ. Nat. Hist. 5: 227. 1845. New name for *Gerardia maritima grandiflora* Benth.

Gerardia maritima major Chapm., Fl. S. Un. St. 300. 1860. "Brackish marshes, Apalachicola, Florida." Different collections of this, made by Dr. Chapman, seen.

Salt marshes, along the coast from North Carolina to Texas. Ranges through the West Indies and on the shore of Yucatan. Prob-

ably not specifically distinct from the northern smaller ally, *A. maritima* (Raf.) Raf.

Flowering from March to September, and soon ripening fruit; in subtropical Florida flowering and fruiting throughout the year. Corolla pink, with two yellow lines and many small purple-red spots within throat anteriorly.

Pennell (Florida)—4702, 9550, 9561.

3. *Agalinis purpurea* (L.) Pennell.

Gerardia purpurea L., Sp. Pl. 610. 1753. "Habitat in Virginia, Canada." Linnean diagnosis includes long- and short-pedicel plants, so could include any pink (= "purple") flowered species. The first citation accompanied by a figure, Plukenet's *Digitalis virginiana rubra, foliis & facie Antirrhini vulgaris*, evidently the prevalent plant of the Atlantic seaboard, is considered as the type.

Agalinis palustris Raf., New Fl. Amer. 2: 62. 1837. "Near marshes. . . . From New England to Carolina." Type not known to exist, but characterization evidently of the common species of the Atlantic seaboard.

? *Agalinis corymbosa* Raf., l. c. 63. 1837. "Carolina and Florida." Type not known to exist; either the species now considered or a near ally.

Agalinis purpurea (L.) Pennell, Bull. Torr. Bot. Club 40: 126. 1913.

Moist sandy soil, edges of salt-marsh, of ponds or of rivers, depressions in sand-dunes, or locally on barren soil, common and locally abundant through the Coastal Plain, especially near the coast, along rivers and sand-hills, locally absent or replaced by derivative species in the longleaf pine belt; southward in a modified form to extreme southern Florida; inland much less frequent, although ascending river-valleys into the southern Appalachians. Ranges from Massachusetts to Florida, Minnesota, Nebraska and Texas.

Flowering from mid-July to mid-September, and soon ripening fruit. Corolla rose-pink, with two yellow lines and many small diffused purple-red spots within throat anteriorly.

Pennell (North Carolina)—4914, 4927, 4932, 4948. (South Carolina)—4850, 4854, 4869, 4876. (Georgia)—4735a, 4746, 4753, 4758, 4767, 4769, 4784, 4811. (Florida)—4703, 4799, 4806. (Mississippi)—4357.

4. *Agalinis virgata* Raf.

Agalinis virgata Raf., New Fl. Amer. 2: 62. 1837. "Glades of pine woods in South New Jersey near Mullica Hill, etc." Type not known to exist.

Moist sandy pine barrens, in the Coastal Plain south to South Carolina. Ranges northward to Long Island.

Flowering from September to mid-October, and soon ripening fruit. Corolla pink, with two yellow lines and diffused purple-red spots within throat anteriorly.

Pennell (North Carolina)—4902, 4921. (South Carolina)—4877.

5. *Agalinis pinetorum* Pennell.

Agalinis pinetorum Pennell, Bull. Torr. Bot. Club 40: 424. 1913. "Type, St. Marks, Wakulla Co., Florida, Sept. 26, 1912, F. W. Pennell 4708, in Herb. University of Pennsylvania."

Agalinis delicatula Pennell, l. c. 425. 1913. "Type, Ponce de Leon, Holmes Co., Florida, Sept. 17, 1912, F. W. Pennell 4661 in Herb. University of Pennsylvania." A distinct-seeming plant, with leaves more slender, filiform, curling in drying, and corolla within not spotted with purple-red. Until known from other stations not maintained as a species.

Moist soil in longleaf pineland, and on coastal prairie, southern Georgia and northern Florida to Louisiana.

Flowering in September and October, and soon ripening fruit. Corolla pink, with two yellow lines and purple-red spots within throat anteriorly.

Pennell (Georgia)—4734, 4738, 4750, 4770, 4771, 4773, 4775, 4781, 4791. (Florida)—(4661 *delicatula*), 4688, 4708, 4795.

6. *Agalinis harperi* Pennell.

Agalinis harperi Pennell; Small, Fl. Miami 167, 200. 1913. "Type, St. Marks, Wakulla County, Florida, F. W. Pennell 4707." Type, collected September 25, 1912, seen in Herb. University of Pennsylvania.

Moist sandy pineland and borders of salt-marshes, longleaf pineland, from southern Georgia south to the Everglades of southern Florida. Also on the Bahamas.

Flowering northward from mid-September to October, and soon ripening fruit, southward flowering and fruiting throughout the year. Corolla pale rose-pink, with two yellow lines and small purple-red spots mostly along these lines within throat anteriorly. This has been confused with the northern "*Gerardia paupercula*."

Pennell (Georgia)—4726, 4810. (Florida)—4701, 4707, 4711.

7. *Agalinis fasciculata* (Ell.) Raf.

Gerardia fasciculata Ell., Sketch Bot. S. C. and Ga. 2: 115. 1822. "Grows principally in lands subject to occasional inundation from the ocean . . . on Eding's Island near Beaufort very common." Type seen in the Elliott Herbarium at the Charleston Museum.

Agalinis fasciculata (Ell.) Raf., New Fl. Amer. 2: 63. 1837.

Moist to dry sandy loam or clay soil, in depressions among sand-dunes, edges of salt-marsh, or loam soil in limestone districts; the only species of cultivated fields; locally common through the Coastal Plain from South Carolina to southern Florida and westward near the Gulf Coast. Ranges westward to Texas and southern Missouri. In southern Florida represented by a variant with less scabrous stem.

Flowering from August to October and soon ripening fruit. Corolla pink, with two yellow lines and many diffused purple-red spots within throat anteriorly.

Pennell (North Carolina)—4949. (South Carolina)—4849, 4860, 4863, 4868. (Georgia)—4735, 4740, 4747, 4751, 4755, 4761, 4766, 4772, 4792, 4818. (Florida)—4669, 4675, 4680, 4695, 4697, 4706, 4717, 4718, 4793, 9544, 9562. (Mississippi)—4356, 4370. (Louisiana)—4267, 4276, 4303, 4304, 4330.

8. *Agalinis georgiana* (Boynton) Pennell.

Gerardia georgiana Boynton, Biltm. Bot. Stud. 1: 148. 1902. "In the pine barrens near Cordele, Dooly County, Georgia, in September, 1901. . . . In moist sandy soil in pine barrens. . . . The type specimens are deposited in the Biltmore Herbarium." Type, collected Sept. 18, 1901, seen in the Biltmore Herbarium.

Agalinis georgiana (Boynton) Pennell, Bull. Torr. Bot. Club 40: 427. 1913.

Dry sandy or clay soil, in longleaf pineland, southern Georgia, southern Alabama and northern Florida.

Flowering from mid- to late-September, and soon ripening fruit. Corolla lavender-pink, without yellow lines or purple-red spots within throat anteriorly.

Pennell (Georgia)—4728, 4739. (Florida)—4586, 4662, 4665, 4693. (Alabama)—4609, 4629, 4632.

9. *Agalinis pulchella* Pennell.

Agalinis pulchella Pennell, Bull. Torr. Bot. Club 40: 428. 1913. "Type, Ponce de Leon, Holmes Co., Florida, Sept. 17, 1912, F. W. Pennell 4658, in Herb. University of Pennsylvania."

Dry open sandy longleaf pineland, southern Georgia and northern Florida, westward to Louisiana.

Flowering in September, fruiting in October. Corolla rose-pink, with two yellow lines and relatively large longitudinal purple-red spots within throat anteriorly.

Pennell (Georgia)—4731, 4776, 4779. (Florida)—4587, 4650, 4658, 4663, 4692. (Alabama)—4427, 4452, 4454, 4455, 4493, 4515, 4642.

10. *Agalinis filifolia* (Nutt.) Raf.

Gerardia filifolia Nutt., Gen. Pl. N. Amer. 2: 48. 1818. "Hab. In West Florida. Dr. Baldwin." No type in the herbarium of the Academy of Natural Sciences of Philadelphia, but the description is quite distinctive. *Agalinis filifolia* (Nutt.) Raf., New Fl. Amer. 2: 65. 1837.

Rather dry sandy longleaf pineland, in the Coastal Plain from southern Georgia southward to southern Florida.

Flowering in September and early October, and soon ripening fruit. Corolla rose-pink, with two yellow lines and diffused purple-red spots within throat anteriorly.

Pennell (Georgia)—4741, 4752, 4785, 4821, 4828, 10174. (Florida)—4671, 4673, 4694, 4800, 4803.

11. *Agalinis laxa* Pennell.

Agalinis laxa Pennell, Bull. Torr. Bot. Club 40: 431. 1913. "Type, Brunswick, Glynn Co., Georgia, Oct. 10, 1912, F. W. Pennell 4824, in Herb. University of Pennsylvania."

Dry sandy longleaf pineland, or more especially on river-sandhills and old dunes, near the coast, South Carolina to central Florida.

Flowering in late September and October, and soon ripening fruit. Corolla pink, with two yellow lines and, especially along these, small purple-red spots within throat anteriorly.

Pennell (South Carolina)—4880. (Georgia)—4778, 4783, 4824. (Florida)—4801, 4805.

12. *Agalinis holmiana* (Greene) Pennell.

Gerardia holmiana Greene, Pittonia 4: 52. pl. 10. 1899. "Plentiful in open pine and oak groves along Michigan Avenue south of the Soldiers' Home grounds near Brookland, D. C., collected by Mr. Holm and the writer, 20 Oct., 1898." Probable type seen in the herbarium of the New York Botanical Garden, and I have myself collected the plant at the type station.

Agalinis holmiana (Greene) Pennell, Bull. Torr. Bot. Club 40: 429. 1913.

Dry sandy pineland, in the Coastal Plain; near the coast south to South Carolina, and apparently in the sand-hills near the Fall-Line southwestward into Georgia. Ranges northward to Long Island, New York.

Flowering from late August to mid-October, and soon ripening fruit. Corolla rose-pink, with two yellow lines, and, especially along these, small purple-red spots within throat anteriorly.

Pennell (North Carolina)—4904, 4923, 4929. (South Carolina)—4864.

13. *Agalinis stenophylla* Pennell, sp. nov.

Plant dull-green or purplish, tending to blacken in drying. Stem 6-7 dm. tall, slender, with many ascending branches, essentially glabrous. Leaves ascending-spreading, filiform-setaceous, entire, acuminate, those of the stem 2-3 cm. long, .1-.3 mm. wide; scabroughened to glabrous above. Axillary fascicles scarcely or not developed. Racemes scarcely elongate, often broken, usually but one flower of each pair developed, 1-6 flowered. Pedicels ascending, glabrous, in flower 8-12 mm. long, in fruit 15-20 mm. long, 2-2.5 times the length of the bracts, some on all the branches appearing "terminal." Calyx-tube 2.5 mm. long, hemispheric-campanulate, $\frac{2}{3}$ - $\frac{4}{5}$ the length of the capsule, truncate, its lobes .1-.3 mm. long, triangular-subulate, not callose. Corolla 17-20 mm. long; its tube 11-17 mm. long, slightly upcurved, its lobes 6-7 mm. long, rounded to retuse, all spreading; externally minutely pubescent,

within pubescent below sinus and over entire width of basal portions of posterior lobes; probably rose-pink (not seen fresh). Anthersacs 1.7–2 mm. long, lanceolate, acuminate at distal apex, lanate with white hairs on the valvular surface. Style glabrous. Stigma 1.5–2 mm. long. Capsule 3–4 mm. long, globose-ovoid, dark-brown. Seeds .5–.6 mm. long; testa dark-brown to nearly black, with reticulations heavy and relatively remote; intra-reticular lines not discernible.

Type, Tampa, Florida, collected in flower and young fruit October, 1877, A. P. Garber 281; in Herb. Academy of Natural Sciences of Philadelphia.

Known only from the original collection.

14. *Agalinis setacea* (Walt.) Raf.

Anonymos setacea Walt., Fl. Car. 170. 1788. Supposedly from lower South Carolina, but probably from much further west. Type in the British Museum identified by Dr. A. B. Rendle as agreeing with my number 4757 from Cobb, Sumter Co., Georgia.

Gerardia plukenetii Ell., Sketch Bot. S. C. and Ga. 2: 114. 1822. "Grows in wet spongy soils, very common between the Oakmulgee and Chatahouche Rivers." Type seen in the Elliott Herbarium at the Charleston Museum. Statement of habitat probably due to confusion with *Agalinis pinetorum* Pennell.

Agalinis setacea (Walt.) Raf., New Fl. Amer. 2: 64. 1837.

Gerardia filifolia gatesii Benth., in DC. Prod. 10: 518. 1846. "In Alabama (Gates!)." Type in the Kew Herbarium, identified, from a fragment sent me, as this species.

Dry open sandy pineland. In the Coastal Plain from western Georgia and northern Florida to eastern Mississippi, usually in long-leaf pineland; inland in pinewoods on mountain-slopes through northern Georgia and northern Alabama.

Flowering from mid-September to October, and soon ripening fruit. Corolla rose-pink, with two yellow lines and many small diffused purple-red spots within throat anteriorly.

Pennell (Georgia)—4757, 5710. (Florida)—4569, 4570, 4583, 4584, 4672. (Alabama)—4426, 4457, 4461, 4517, 4523, 4524, 4561, 4623, 5690. (Mississippi)—4382.

15. *Agalinis keyensis* Pennell, sp. nov.

Plant dull-green, tending to blacken in drying. Stem at least 7 dm. tall, slender, with many spreading-ascending branches, sparingly scabrelous or glabrous. Leaves spreading, filiform, entire, acuminate, those of the stem (lowest not seen) .8–1.2 cm. long, .2–.4 mm. wide; scabrous above. Axillary fascicles none. Racemes not elongate, much broken and but one flower of each pair developed, 1–4 flowered. Pedicels ascending, glabrous, in flower 3–4 mm. long, in fruit 4–6 mm. long, about equaling the bracts, some

on all the branches appearing "terminal." Calyx-tube 2.5–3 mm. long, hemispheric, $\frac{1}{2}$ – $\frac{2}{3}$ the length of the capsule, truncate, its lobes .4–.6 mm. long, triangular-subulate, not becoming callose. Corolla 18–20 mm. long; its tube 14–15 mm. long, slightly upcurved, its lobes 4–5 mm. long, truncate to emarginate, all spreading; externally minutely pubescent, within pubescent below sinus and over entire width of basal portions of posterior lobes; probably pink (not seen fresh). Anther-sacs 2.5 mm. long, lanceolate, cuspidate at distal apex, lanate with white hairs on the valvular surface. Style glabrous. Capsule 3–3.5 mm. long, globose, brown. Seeds .7–.9 mm. long; testa dark-brown to nearly black, with reticulations rather fine; intrareticular lines not discernible.

Type: woods, Pine Key, Florida, collected in flower and fruit by Mr. Blodgett; in herb. Columbia University at the New York Botanical Garden.

Known only from the original station in the Florida Keys. Not re-collected; Dr. Small and myself have hunted in vain for this on Pine Key, but at the time of our joint visit the season had been unusually dry.

16. *Agalinis oligophylla* Pennell.

Gerardia aphylla grandiflora Benth., Comp. Bot. Mag. 1: 174. 1836. "Jacksonville [Drummond]." Type, labeled "Jacksonville," [certainly an error for Louisiana], seen in Kew Herbarium.

Gerardia plukenetii microphylla A. Gray, Syn. Fl. N. Amer. II. 1: 293. 1878. "Louisiana, Drummond, Hale." Type, an isotype of *Gerardia aphylla grandiflora* Benth., seen in Gray Herbarium.

Agalinis oligophylla Pennell, Bull. Torr. Bot. Club 40: 432. 1913. New name for *Gerardia plukenetii microphylla* A. Gray.

Moist longleaf pineland, in the Coastal Plain from southern Mississippi to southeastern Texas.

Flowering from late September to late October, and soon ripening fruit. Corolla rose-pink, with two yellow lines and, mostly along these, rather large purple-red spots within throat anteriorly.

17. *Agalinis aphylla* (Nutt.) Raf.

Gerardia aphylla Nutt., Gen. Pl. N. Amer. 2: 47. 1818. "Hab. From North Carolina to Florida, where it was first detected by Dr. Baldwin." Type seen in herbarium of the Academy of Natural Sciences of Philadelphia.

Agalinis microphylla Raf., New Fl. Amer. 2: 65. 1837. "In Florida, collected by Le Conte (Collins herb.)." Type not known to exist.

Agalinis aphylla (Nutt.) Raf., l. c. 65. 1837.

Moist sandy longleaf pineland, near the coast, North Carolina to northern Florida and Louisiana.

Flowering from mid-September to early November, and soon ripening fruit. Corolla pale-pink, with two yellow lines but without purple red spots within throat anteriorly.

Pennell (Georgia)—4748, 4789, 4808, 4819. (Florida)—4647, 4655, 4664, 4676, 4682, 4712, 4798, 4814.

18. *Agalinis decemloba* (Greene) Pennell.

Gerardia decemloba Greene, Pittonia 4: 51. pl. 9. 1899. "Plant not uncommon about Brookland, D. C., inhabiting grassy knolls and hillsides bordering on pine woods." Type probably seen in Herb. New York Botanical Garden, and I have collected the plant at the type station.

Agalinis decemloba (Greene) Pennell, Bull. Torr. Bot. Club 40: 434. 1913.

Dry open soil, sandy or clay, southward on mountain sides, locally frequent in the Piedmont and southern Appalachians. Ranges from southeastern Pennsylvania to northern Alabama, but with a very broken distribution and wholly east of the mountains.

Flowering from late August to mid-October, and soon ripening fruit. Corolla pink, with two yellow lines and fine purple-red spots within throat anteriorly.

Pennell (Alabama)—5687. (Tennessee)—5709.

19. *Agalinis tenella* Pennell.

Agalinis tenella Pennell, Bull. Torr. Bot. Club 40: 434. 1913. "Type Thomasville, Thomas Co., Georgia, Sept. 28, 1912, F. W. Pennell 4727 in Herb. University of Pennsylvania."

Dry sandy pineland, in the Coastal Plain from South Carolina to north-central Florida, west to Louisiana.

Flowering from mid-September to mid-October, and soon ripening fruit. Corolla pink, with two yellow lines and purple-red spots within throat anteriorly.

Pennell (South Carolina)—4853, 4871. (Georgia)—4727, 4744, 4756, 4764, 4768, 4774, 4777, 4782, 4786.

20. *Agalinis erecta* (Walt.) Pennell.

Anonymos erecta Walt., Fl. Car. 170. 1788. Presumably from lower South Carolina; no type in the Walter herbarium in the British Museum and only identified as possibly the plant here considered.

Gerardia setacea parvifolia Benth., Comp. Bot. Mag. 1: 174. 1836. "Jacksonville." Drummond. Type in Kew Herbarium verified by Dr. N. E. Brown as agreeing with my number 4659 from Ponce de Leon, Florida.

Agalinis obtusifolia Raf., New Fl. Amer. 2: 64. 1837. "West Tennessee, Alabama and Florida." Type not known to exist. Description, and certainly the name, belongs to the plant now considered, although the Tennessee specimen could hardly belong here.

Agalinis erecta (Walt.) Pennell; Small, Fl. Florida Keys 133. 1913.

Moist to dry sandy pineland, mostly longleaf, usually common, in the Coastal Plain, from North Carolina to southernmost Florida, and west to Louisiana. Occurs northward in southward Delaware.

Flowering from early September to mid-October, and soon ripening fruit. Corolla pink, with the two yellow lines and purple-red spots within throat anteriorly faint or absent.

This and related species have been known as "*Gerardia skinneriana*."

Pennell (North Carolina)—4910, 4915, 4926, 4933. (South Carolina)—4870, 4879. (Georgia)—4733. (Florida)—4596, 4640, 4646, 4659, 4667, 4685, 4710, 4797, 4804, 4815. (Alabama)—4428, 4453, 4503, 4526, 4548, 4562, 4614, 4634. (Mississippi)—4363, 4399. (Louisiana)—4226, 4227, 4231.

21. *Agalinis gattingeri* (Small) Small.

Gerardia tenuifolia leptophylla Benth., Comp. Bot. Mag. 1: 174. 1836. "Jacksonville, Louisiana." Drummond. Type, doubtless from Louisiana, seen in Kew Herbarium.

Gerardia tenuifolia filiformis Benth., in DC. Prod. 10: 518. 1846. "Southern States." Type labeled "Amer. bor. Rafinesque. *Gerardia filiformis* Raf.," seen in Kew Herbarium.

Gerardia gattingeri Small, Fl. S. E. Un. St. 1078, 1338. 1903. "Type, Curtiss N. A. Pl. no. 1910* in Herb. C. U." Type, collected by A. Gattinger on hills around Nashville, Tennessee, seen in Herb. Columbia University at the New York Botanical Garden.

Agalinis gattingeri (Small) Small, in Britton & Brown, Ill. Fl. N. Un. St. and Can. ed. II. 3: 213. 1913.

Dry to moist, sandy or clayey soil, woodland, barrens or open bluffs, in central Tennessee and northern Alabama. Ranges from southwestern Ontario to Minnesota, south to Alabama and eastern Texas.

Flowering from late August to mid-October, and soon ripening fruit. Corolla pink, with two yellow lines and several to many rather large purple-red spots within throat anteriorly.

Pennell (Tennessee)—5705.

22. *Agalinis tenuifolia* (Vahl) Raf.

Gerardia tenuifolia Vahl, Symb. Bot. 3: 7. 1794. "Habitat in America septentrionali." Type in Herb. Universitetets Botaniske Museum, Copenhagen, Denmark, collected by Von Rohren, and said to be probably from Philadelphia, is identified by Dr. C. H. Ostenfeld as agreeing with my number 2681 from Pennsylvania.

Agalinis tenuifolia (Vahl) Raf., New Fl. Amer. 2: 64. 1837.

Loam or sandy soil, moist or dry, usually in open deciduous woodland, common throughout above the Fall-line, through the eastern Appalachians, southward smaller-leaved, passing into var. *polypphylla*, westward, mainly near river-banks, passing into var. *macrophylla*; descending into the Coastal Plain locally in heavier soils, as limestone, and in river-bottoms, there passing into var. *leucanthera*. Ranges from Maine to Michigan, south to Georgia and Louisiana.

Flowering from August to October, and soon ripening fruit. Corolla purplish-pink, with two yellow lines and small diffused purple-red spots within throat anteriorly.

Pennell (Georgia)—4091.

22a. *Agalinis tenuifolia leucanthera* (Raf.) Pennell, comb. nov.

Gerardia leucanthera Raf., Fl. Ludov. 50. 1817. Louisiana. C. C. Robin.
Type not seen.

Stem 4–10 dm. tall, widely much branched. Pedicels .5–1.5 times the length of the bracts. Corolla 15–23 mm. long. Capsule 6–7 mm. long. Seeds apparently slightly longer and more evidently reticulate.

Usually in moist soil, loam or clay, more rarely in sand, woodland or meadow, especially near streams, in alluvial or limestone soils, in the Coastal Plain from southern Georgia and northern Florida to eastern Texas.

Pennell (Georgia)—4759. (Florida)—4601, 4670, 4699, 4721. (Alabama)—4522, 4597, 4606, 4619.

22b. *Agalinis tenuifolia macrophylla* (Benth.) Blake.

Gerardia tenuifolia macrophylla Benth., Comp. Bot. Mag. 1: 174. 1836. "St. Louis, Jacksonville." Drummond. Fragment of type, from Kew Herbarium, labeled "St. Louis," seen.

Gerardia besseyana Britton, Mem. Torr. Bot. Club 5: 295. 1894. New name for *Gerardia tenuifolia macrophylla* Benth., not *Gerardia macrophylla* (Nutt.) Benth.

Agalinis tenuifolia macrophylla (Benth.) Blake, Rhodora 20: 71. 1918.

In situations similar to that of the species, but more frequent along river-banks, from northern Alabama and Mississippi northward. Ranges from southern Ontario and Minnesota south to Alabama and Oklahoma.

Pennell (Alabama)—5719. (Mississippi)—5685. (Tennessee)—5714.

22c. *Agalinis tenuifolia polyphylla* (Small) Pennell, comb. nov.

Gerardia polyphylla Small, Bull. Torr. Bot. Club 25: 618. 1898. "The original specimens were collected by the writer on Little Stone Mountain, De Kalb County, Georgia, in September, 1895." Type seen in Herb. New York Botanical Garden.

Dry light soil over granite, locally in the granite region of central Georgia.

Pennell (Georgia)—4065, 5696, 5699.

23. *Agalinis divaricata* (Chapm.) Pennell.

Gerardia divaricata Chapm., Fl. S. Un. St. 299. Mar., 1860. "Low sandy pine barrens, West Florida." No type indicated, but numerous specimens collected and distributed by the describer seen.

Gerardia mettauerei Wood, Class-Book 530. Dec., 1860. "Wet sandy places, Middle Fla. (Dr. Mettauerei)." Type seen in herbarium of Columbia University at the New York Botanical Garden.

Gerardia mettauerei clausa Wood, l. c. 530. 1860. "With the others," that is, with the species and *G. mettauerei nuda*. No specimen so labeled seen.

Agalinis divaricata (Chapm.) Pennell, Bull. Torr. Bot. Club 40: 437. 1913.

Dry sandy longleaf pineland, western Florida and southeastern Alabama, mostly abundant.

Flowering in September and October, and soon ripening fruit. Corolla rose-pink, with no yellow lines but with faint purple-red spots within throat anteriorly.

Pennell (Florida)—4572, 4593, 4644, 4657, 4668, 4679, 4684, 4687, 4716. (Alabama)—4622, 4624, 4627, 4633.

24. *Agalinis filicaulis* (Benth.) Pennell.

Gerardia aphylla filicaulis Benth., Comp. Bot. Mag. 1: 174. 1836. "Jacksonville." Drummond. Type in Kew Herbarium, verified by Dr. N. E. Brown, as agreeing with my number 4660 from Florida.

Gerardia mettauerei nuda Wood, Class-Book 530. 1860. "Middle Fl. (Dr. Mettauere, 1855.)" No type seen.

Agalinis filicaulis (Benth.) Pennell, Bull. Torr. Bot. Club 40: 438. 1913.

Moist grassy sandy longleaf pineland, in the Coastal Plain from southern Georgia and northern Florida to eastern Louisiana.

Flowering from mid September to early November, and soon ripening fruit. Corolla lavender pink, without yellow lines or purple-red spots within throat anteriorly.

Pennell (Georgia)—4749, 4788. (Florida)—4594, 4643, 4660, 4677, 4689, 4709, 4796. (Alabama)—4608, 4626.

33. OTOPHYLLA Bentham.

Otophylla Benth., in DC. Prod. 10: 512. 1846.

Type species, *Gerardia auriculata* Michx.

1. *Otophylla auriculata* (Michx.) Small.

Gerardia auriculata Michx., Fl. Bor. Amer. 2: 20. 1803. "In pratis regionis Illinoensis [A. Michaux]." Description sufficiently distinctive.

Otophylla michauxii Benth., in DC. Prod. 10: 512. 1846.

Otophylla auriculata (Michx.) Small, Fl. S. E. Un. St. 1075, 1338. 1903.

Moist to dry prairies, old fields and waysides, known only from Jackson, Madison Co., western Tennessee, where probably introduced. Native of the prairies of the central Mississippi Valley from Michigan to Minnesota and Arkansas.

Flowering from late August to mid-September, fruiting in September and October.

34. BUCHNERA Linné.

Buchnera L., Sp. Pl. 630. 1753.

Type species, *B. americana* L.

Leaves 3-9 cm. long, lanceolate to ovate-lanceolate, relatively coarsely dentate. Corolla-lobes 6-9 mm. long, the tube 2-2½ times the length of the calyx. Capsule 8-9 mm. long, oblong. Stem hirsute-pubescent. 1. *B. americana*.

Leaves 2-7 cm. long, lanceolate-elliptic to linear, entire or the lower slightly dentate. Corolla-tube mostly 1-1½ times the length

of the calyx. Capsule ovate, 5–6.5 mm. long. Seeds. Stem less pubescent or even glabrate.

Leaves prevailing lanceolate-elliptic, mostly obtuse, only the uppermost at times linear and then reduced. Corolla-lobes usually 4–6 mm. long.

2a. *B. elongata obtusa*.

Leaves linear or nearly so, mostly acute to acuminate, only the lowermost if any lanceolate-elliptic. Corolla-lobes usually 6–8 mm. long.

2. *B. elongata*.

1. ***Buchnera americana* L.**

Buchnera americana L., l. c. 630. 1753. "Habitat in Virginia, Canada." Based upon Gron., Fl. Virg. 74. 1743, typified by Clayton 142 from Virginia. Description sufficiently distinctive.

Sandy or sterile loam soil, throughout the area except in the Appalachians, probably more frequent in the Coastal Plain where it may intergrade with *B. elongata obtusa*.

Flowering from June to September, and soon ripening fruit. Corolla purplish-blue throughout.

Pennell (Alabama)—4478, 4518, 4550, 4554.

2. ***Buchnera elongata* Sw.**

Buchnera elongata Sw., Prod. Veg. Ind. Occ. 92. 1788. "India occidentalis, Jamaica"; Fl. Ind. Occ. 1061. 1800, "Habitat in arenosis Indiae occidentalis. Versus jugum montium paroeciae Clarendon Jamaicae."

Sandy soil, dunes and limestone pineland of southern Florida, passing into var. *obtusata*. Ranges through the West Indies, and in northern South America.

Pennell (Florida)—9541, 9543, 9546, 9547, 9552.

2a. ***Buchnera elongata obtusa* Pennell, var. nov.**

Buchnera angustifolia Raf., New Fl. Amer. 2: 32. 1837. "In Alabama." Described as with linear leaves, but these remote. Surely an attenuate state of our variety.

(?) *Buchnera levicaulis* Raf., l. c. 39. 1837. "Florida." Description of stem as angular and quite smooth suggests that this may belong to some other genus. However, while our plant is characteristically pubescent, it occasionally occurs nearly glabrous.

Leaves prevailing lanceolate-elliptic, mostly obtuse, only the uppermost linear and then not elongate. Corolla usually smaller than in the species, its lobes usually 4–6 mm. long. Intergrades with the species in southern Florida and the Bahamas.

Type, open sandy pineland, 1–2 miles north of Abita Springs, St. Tammany Parish, Louisiana, collected in flower and fruit August 14, 1912, F. W. Pennell 4190, in herbarium New York Botanical Garden; isotype in herbarium University of Pennsylvania.

Sandy pineland, in the Coastal Plain from North Carolina to southern Florida, westward to southeastern Texas.

Flowering from March to October, and soon ripening fruit; southward throughout the year. Corolla purplish-blue throughout; occurring also frequently in an albino form.

Pennell (North Carolina)—4911. (South Carolina)—4874, 4882. (Georgia)—4730, 4787, 4812. (Florida)—4704, 4722, 9535, 9645, 9674. (Alabama)—4473. (Louisiana)—4190, 4296.

35. SCHWALBEA Linné.

Schwalbea L., Sp. Pl. 606. 1753.

Type species, *S. americana* L., of Virginia.

1. *Schwalbea australis* Pennell, sp. nov.

Stem 4–8 dm. tall, finely pubescent with short ascending or up-curved hairs. Leaves elliptic-oval, 3–4 cm. long, 12–18 mm. wide, acutish, obscurely reticulate, minutely strigose. Pedicels becoming 4–5 mm. long in fruit. Calyx 10-ridged, its lobes all acute, the posterior linear, 7–10 mm. long, postero-lateral lobes 19–20 mm. long, their free portion 6–7 mm. long, the anterior lobes 20–22 mm. long, united to within 1–2 mm. of their apices. Corolla about 30 mm. long, slender, the lips 10–11 mm. long, the posterior narrowly arched, strongly pubescent externally, the anterior densely lanose within over the bases of the three short lobes. Capsule at least 10 mm. long, not seen mature.

Type, damp pine barrens near Seville, Volusia Co., Florida, collected in flower May 10, 1900, A. H. Curtiss 6742; in herbarium of the New York Botanical Garden.

Distinguished from the northern *S. americana* by the following characters:

Pubescence of stem, pedicels and calyx consisting of recurved hairs.

Leaves elliptic-lanceolate, rarely over 10 mm. wide, usually evidently veined. Anterior calyx-lobes obtuse.

S. americana.

Pubescence of stem, pedicels and calyx consisting of upcurved, usually shorter hairs. Leaves elliptic-oval, usually about 15 mm. wide, usually more obscurely veined. Anterior calyx-lobes acute or acutish.

S. australis.

Sandy soil, rather moist, oak-land and pine-land, in the Coastal Plain from South Carolina to central Florida and Louisiana; inland apparently occasional, seen only from "sandy humid places in the Cumberland Mountains between Montgomery and Jamestown," Tennessee, collected by Rugel in 1841.

Flowering from April to June. Not seen growing.

36. CASTILLEJA Mutis.

Castilleja Mutis; L. f. Suppl. 293. 1781.

Type species, *C. fissifolia* L. f., of Colombia.

1. *Castilleja coccinea* (L.) Spreng.

Bartsia coccinea L., Sp. Pl. 602. 1753. "Habitat in Virginia, Noveboraco . . . Hort. Cliff. 235." From L., Hort. Cliff. 325. 1737, "Crescit in Virginia, unde delatam communicavit DD. Gronovius". From Gron., Fl. Virg. 69. 1743: "Clayton n. 293." Certainly the plant here considered.

Castilleja coccinea (L.) Spreng., Syst. Veg. 2: 775. 1825.

Meadows or moist grassy slopes, loam or sandy loam, in the upland from North Carolina to Alabama.¹⁴ Ranges from Maine to Manitoba, south to Georgia and Kansas.

Flowering from April to early June, and soon ripening fruit. Corolla yellowish-green throughout.

37. **PEDICULARIS** Linné.

Pedicularis L., Sp. Pl. 607. 1753.

Type species, *P. palustris* L., of Europe.

Stem 6-8 dm. tall, glabrous. Leaves shallowly lobed, the sinuses narrow, the lobes with minute regular crenations. Bracts auriculate near base. Rachis of inflorescence glabrous. Fused sepals of each side terminating in a slightly enlarged crenate foliar tip, glabrous or with a very few long hairs near base. Corolla with truncate apex of posterior lobes without tooth-like processes. Capsule brown, scarcely exceeding the calyx, slenderly beaked. Flowering in late summer. 1. *P. lanceolata*.

Stem 1-3 dm. tall, hirsute, especially above. Leaves deeply lobed, the sinuses broad, the lobes with more prominent irregular crenations. Bracts entire near base. Rachis of inflorescence lanate. Fused sepals of each side broadly acute, entire, pubescent along the veins. Corolla with apex of posterior lobes each with a tooth-like process. Capsule straw-colored, twice as long as the calyx, scarcely beaked. Flowering in spring.

2. *P. canadensis*.

1. *Pedicularis lanceolata* Michx.

Pedicularis lanceolata Michx., Fl. Bor. Amer. 2: 18. 1803. "Hab. in regione Illinoensi" (A. Michaux). Type not verified, but description distinctive.

Swales and wet meadows, mountains of North Carolina. Ranges from Massachusetts to Manitoba, south to North Carolina and Nebraska.

Flowering from late July to September. Corolla yellow throughout.

¹⁴ Seen only south to Berkeley Co., lower South Carolina, but this very easily distinguished plant is recorded from upper Georgia by Elliott, Sketch Bot. S. C. and Ga. 2: 132. 1822; and from Etowah Co., Alabama, by Mohr, Contrib. Nat. Herb. 6: 728. 1901.

2. *Pedicularis canadensis* L.

Pedicularis canadensis L., Mant. 86. 1767. "Habitat in America septentrionali. Kalm."

Woodland or knolls in meadows, throughout above the Fall-line, probably more common northward; in the Coastal Plain descending locally to northern Florida. Ranges from Nova Scotia to Manitoba, south to Florida and Texas.

Pennell (Alabama)—9722. (Tennessee)—9789.

38. MELAMPYRUM Linné.

Melampyrum L., Sp. Pl. 605. 1753.

Type species, *M. cristatum* L., of Europe.

Main stem-leaves linear or lanceolate-linear. Bracts conspicuously fimbriate near base, with teeth frequently as long as the width of the blade. Capsules mostly 6-7 mm. long, curved and usually attenuate-beaked. Seeds 2-2.5 mm. long, brown to blackish. 1. *M. lineare*.

Main stem-leaves linear-lanceolate to nearly ovate. Bracts slightly or not fimbriate near base, the teeth shorter than the width of the blades. Capsules frequently larger, reaching 8-9 mm. long, slightly or not curved, and less or not attenuate-beaked. Seeds often larger, reaching 3 mm. long, usually black.

1a. *M. lineare latifolium*.

1. *Melampyrum lineare* Desr.

Melampyrum lineare Desr., Lam., Encyc. 4: 22. 1796. "Rapportee de la Caroline par M. Fraser . . . (v. s.)" Description made from a very young plant, but certainly of the form here considered. Characterization of the calyx as 5-toothed certainly erroneous.

Open woodland, thin acid soil, upland and probably midland districts of North Carolina. In the Appalachians mainly replaced by var. *latifolium*. Ranges northward to Long Island, and through its varieties much further northward and across the continent.

Flowering and fruiting through the summer. Corolla white, more or less pinkish externally, the palate yellow.

1a. *Melampyrum lineare latifolium* (Muhl.) Beauverd.

Melampyrum americanum Michx., Fl. Bor. Amer. 2: 16. 1803. "Hab. a sinu Hudsonis ad montosam Carolinam." (A. Michaux.) Description evidently of the prevalent inland broader-leaved plant.

Melampyrum latifolium Muhl. (Cat. 57. *nomen nudum*); Eaton, Bot. 316. 1818. From Muhlenberg's Catalog, the type station is in Delaware. Type not seen, but evidently is the prevalent inland plant.

Melampyrum lineare latifolium (Muhl.) Beauverd, Mem. Soc. Phys. Geneve 38: 474. 1916.

Moist open woodland, in the Appalachians south to northern Georgia. The prevalent inland plant, southward attaining its greatest distinctness from the species.